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National Energy Board

Reasons for Decision



Westcoast Energy Inc.

GH-1-93

June 1993

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National Energy Board

Reasons for Decision

Westcoast Energy Inc.

Application dated 19 January 1993,
as amended, for Pine River Plant and
Grizzly Pipeline System Expansion

GH-1-93

June 1993

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Abbreviations

Act	<i>National Energy Board Act</i>
AFUDC	allowance for funds used during construction
Amoco	Amoco Petroleum Company Ltd.
B.C.	British Columbia
Bcf	billion cubic feet
CSA	Canadian Standards Association
CanWest	CanWest Gas Supply Inc.
DFO	Department of Fisheries and Oceans
EARP Guidelines Order	<i>Environmental Assessment and Review Process Guidelines Order</i>
El Paso	El Paso Natural Gas Company
FEARO	Federal Environmental Assessment and Review Office
ha	hectare
H ₂ S	hydrogen sulphide
Kern River	Kern River Gas Transmission Company
kg	kilogram
km	kilometre
kPa	kilopascal
LDC	local distribution company
MCRC	Mineral and Chemical Resources Company
MELP	B.C. Ministry of Environment, Lands and Parks
m ³	cubic metres
m ³ /d	cubic metres per day
mm	millimetre
MMcf/d	million cubic feet per day
NEB, the Board	National Energy Board
Norcen	Norcen Energy Resources Limited
Northwest	Northwest Pipeline Corporation
Ocelot	Ocelot Energy Inc.
O.D.	outside diameter

Petro-Canada	Petro-Canada Resources
Petrosul	Petrosul International Ltd.
PGT	Pacific Gas Transmission Company
PNG	Pacific Northern Gas Ltd.
ppm	parts per million
Province	the B.C. Ministries of Energy, Mines and Petroleum Resources and Environment, Lands and Parks, on behalf of the Province of B.C.
psi	pounds per square inch
RDLC	Ron Dickson Labour Consulting
RMEC	Rocky Mountain Ecosystem Coalition
Sceptre	Sceptre Resources Limited
SCOT	Shell Claus Offgas Treating
Shell	Shell Canada Limited
SO ₂	sulphur dioxide
Talisman	Talisman Energy Inc.
Tcf	trillion cubic feet
TEG	tri-ethylene glycol
Transwestern	Transwestern Pipeline Company
U.S.	United States
Westcoast, the Company, or the Applicant	Westcoast Energy Inc.
µg/m ³	micrograms per cubic metre

Recital and Appearances

IN THE MATTER OF the *National Energy Board Act* ("the Act") and the Regulations made thereunder; and

IN THE MATTER OF an application dated 19 January 1993, as amended, by Westcoast Energy Inc., pursuant to section 58 of the Act, for an order granting exemption from the provisions of sections 30, 31, and 47 of the Act in respect of certain facilities proposed to be added to its pipeline system, filed with the Board under File 3400-W005-67; and

IN THE MATTER OF National Energy Board Directions on Procedure, Order GH-1-93.

HEARD at Fort St. John, British Columbia on 5 and 6 May 1993.

BEFORE:

R.B. Horner, Q.C.	Presiding Member
J.-G. Fredette	Member
R. Illing	Member

APPEARANCES:

J. Lutes	Westcoast Energy Inc.
R. Sirett	
B. Rogers	B.C. Provincial Council of Carpenters
R. Loro	Peace River Labour Council
R. Dickson	Ron Dickson Labour Consulting and six international craft unions
D.A. Holgate	Amoco Canada Petroleum Company Ltd. and Talisman Energy Inc.
W.B. Frasson	BC Gas Inc.
R.C. Beattie	CanWest Gas Supply
B. Thompson	Norcen Energy Resources Limited
E.S. Decter	Shell Canada Limited
M. Heule	Ocelot Energy Inc.
R.S. Miller	Petro-Canada
R. Lee	Sceptre Resources Limited

(vii)

N. Conrad for R.E. Wolf and the Riel Institute

M.D. Sawyer Rocky Mountain Ecosystem Coalition, also representing the Speak Up For Wild Life Foundation, the Riel Institute, the Western Canada Wilderness Committee, and the Chetwynd Environmental Society

J. Hannam Peace River Regional District, Electoral Area 'E'

D. Champagne National Energy Board

Background

1.1 The Application

On 19 January 1993, Westcoast Energy Inc. ("Westcoast", "the Company", or "the Applicant") filed an application with the National Energy Board ("NEB" or "the Board") pursuant to section 58 of the *National Energy Board Act* ("the Act") for an order authorizing an expansion of its Pine River Plant and Grizzly Pipeline System in British Columbia ("B.C.")¹. Westcoast later filed a series of amendments to its application, as well as an environmental supplement, under covering letter dated 26 February 1993. Westcoast made further amendments to its application by correspondence dated 3 and 5 May 1993.

As shown on the Westcoast system map comprising Figure 1-1, the Pine River Plant is situated in northeastern B.C., near the town of Chetwynd. The overall plant complex includes both a gas processing plant and a sulphur recovery plant. Raw gas is transported to the plant through the Grizzly Pipeline System, which is also owned and operated by Westcoast.

The proposed expansion of the Pine River Plant, which is estimated to cost nearly \$232 million, would increase the raw gas processing capacity of the plant from $7.37 \text{ } 10^6 \text{ m}^3/\text{d}$ (260 MMcf/d) to $15.9 \text{ } 10^6 \text{ m}^3/\text{d}$ (560 MMcf/d) commencing 1 November 1994. The residue gas plant capacity would increase from $5.38 \text{ } 10^6 \text{ m}^3/\text{d}$ (190 MMcf/d) to $12.5 \text{ } 10^6 \text{ m}^3/\text{d}$ (441 MMcf/d), while the sulphur plant capacity would increase from 1097 to 2000 tonnes per day.

The companion expansion of the upstream Grizzly Pipeline System, estimated to cost about \$68.3 million, would involve the installation of four separate segments of pipeline. The proposed pipeline segments are depicted in Figure 1-2 and identified as follows:

- (1) *The Chamberlain Pipeline* - A 323.9 mm (12.75 inch) diameter pipeline approximately 8.9 km (5.5 miles) in length connecting the Chamberlain field to the South Sukunka pipeline;
- (2) *The Murray River Pipeline* - A 323.9 mm (12.75 inch) diameter pipeline approximately 24.0 km (14.9 miles) in length connecting the Murray River field to the existing raw gas transmission system;
- (3) *The Sukunka Loop Pipeline* - A 610 mm (24 inch) diameter pipeline loop approximately 15.2 km (9.4 miles) in length providing additional pipeline capacity to the Sukunka and South Sukunka areas; and

¹ The original construction of the Pine River Plant and Grizzly Pipeline System was authorized by the Board through Certificate GC-58 dated 3 February 1978.

Figure 1-1
Westcoast Energy Inc.
Pipeline Systems Map

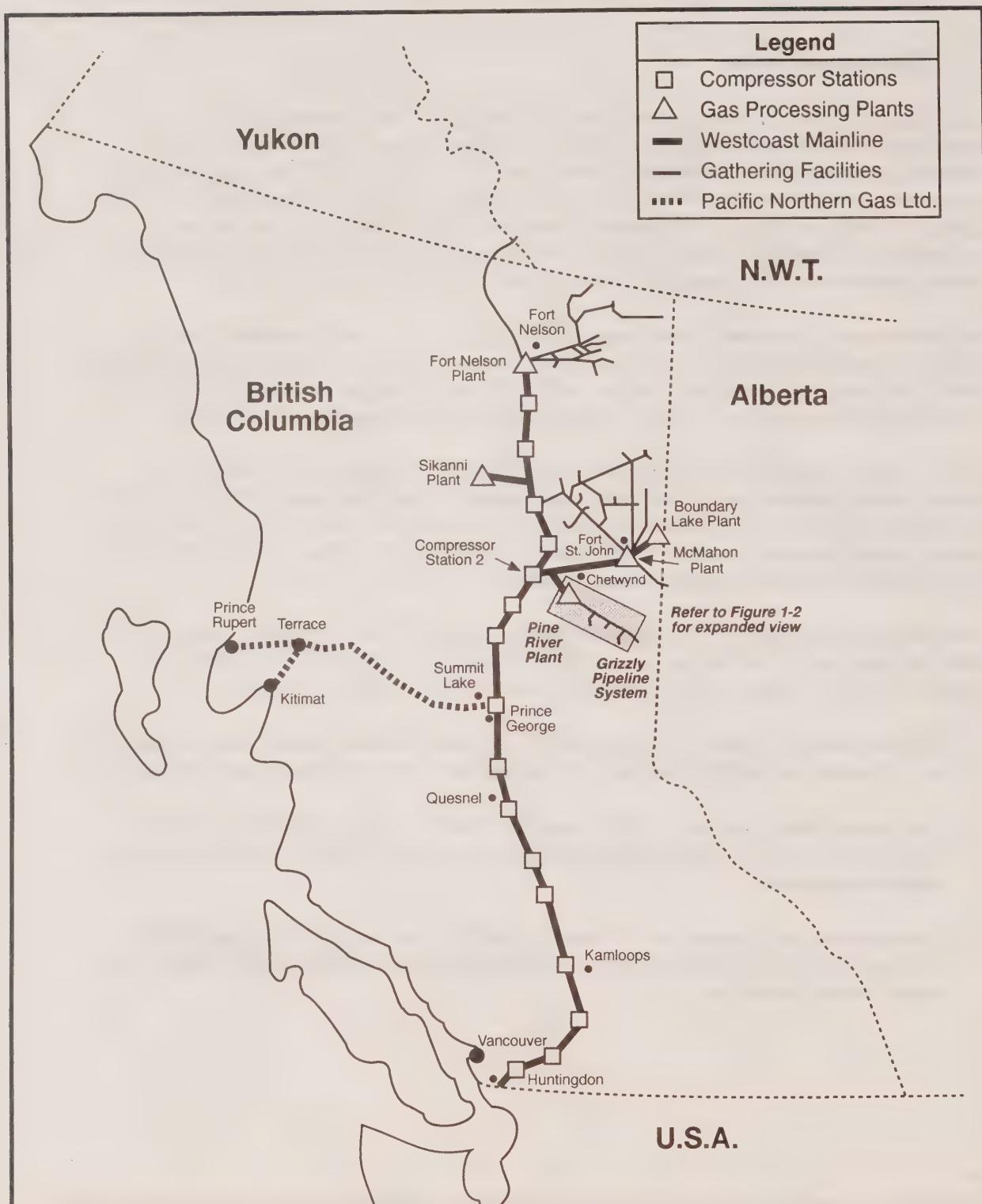
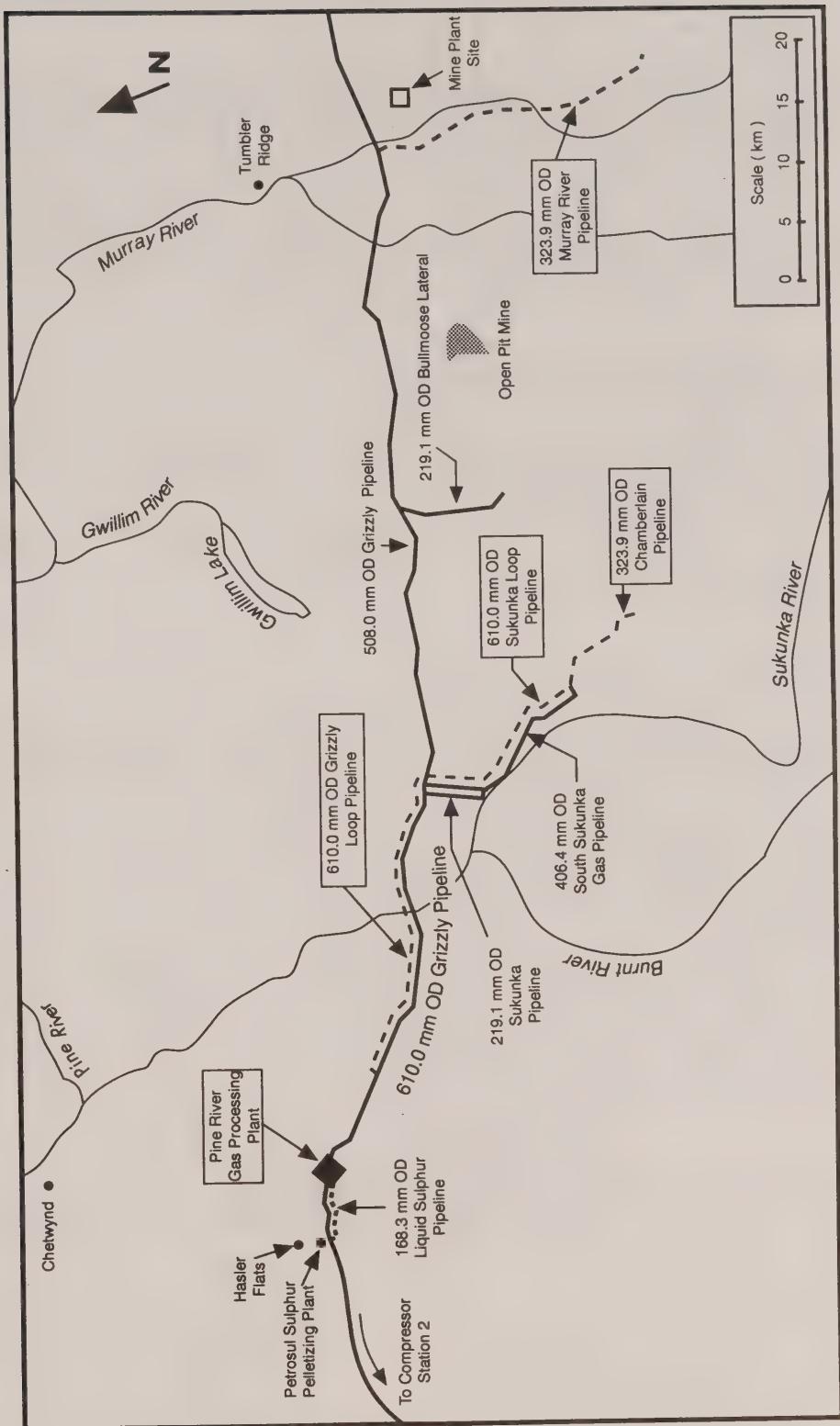


Figure 1-2
Location Map - Pine River Plant
and Grizzly Pipeline System Expansion



(4) *The Grizzly Loop Pipeline* - A 610 mm (24 inch) diameter pipeline loop approximately 26.6 km (16.5 miles) in length providing additional Grizzly pipeline capacity to the Pine River Plant.

The expansion project also encompasses a proposal by Westcoast to construct an above-ground pipeline, 168.3 mm (6.63 inches) in diameter and 5.5 km (3.4 miles) in length, to carry liquid sulphur from the sulphur recovery plant to a sulphur pelletizing plant owned and operated by Petrosul International Ltd. ("Petrosul")¹ (reference Figure 1-2 for location). This pipeline would replace the trucking operation presently used to transport liquid sulphur between the plants. Further details on this pipeline, as well as the other facilities covered by the application, are provided in Chapter 4 of this report.

1.2 The GH-1-93 Proceeding

On 10 March 1993, the Board issued Order GH-1-93 setting out Directions on Procedure for the public hearing to be conducted into the Pine River Plant and Grizzly Pipeline System Expansion proposal by Westcoast.

Further to Order GH-1-93, the Board conducted a public hearing on the application in Fort St. John, B.C. on 5 and 6 May 1993.

1.3 Motions for Adjournment

Two motions for adjournment were filed by the Rocky Mountain Ecosystem Coalition ("RMEC") and Mr. R.E. Wolf on 26 and 29 April 1993 respectively. The first motion sought an adjournment of the hearing until 60 days after the submission of all on-going studies on environmental effects to allow parties sufficient time to review that information. The second motion requested an adjournment until six months after the submission of those studies. Both motions were based upon the same grounds, namely:

- "1. The extremely short period of public notice prior to the deadline for interventions breaches the doctrine of fairness and places the public at a disadvantage with regard to effectively participating in the process.
2. Important information on the environmental effects of the proposed project are not and will not be available prior to the scheduled hearing date thereby making it an impossibility for the public to develop a cogent position or comment on those aspects of the proposed project."

¹ The costs of the proposed liquid sulphur pipeline were included by Westcoast in the \$232 million estimate for the Pine River Plant expansion. For more information on Westcoast's cost estimates, reference can be made to section 4.5 of this report.

The Board decided to hear the motions in Fort St. John as a preliminary matter, after which it would be decided whether or not to proceed with the hearing.

The substance of the arguments presented in support of the motion to adjourn relied upon a number of points. The Board heard submissions in support of and against the granting of an adjournment, and considered each point in coming to a decision on the motion.

1.3.1 Adequacy of Notice

Several intervenors supported the motion for adjournment on the grounds that the publication of the Notice of Public Hearing in various newspapers had not appeared sufficiently in advance of the deadline for the filing of interventions. This was viewed by some parties as placing the public at a disadvantage in terms of preparing arguments. Countering this argument, however, was the view that preparation of an intervention is a simple procedure which entails minimal resources, and that the time frames for the submission of information requests and comments after filing an intervention allow each interested party sufficient time to assess their own position. Additionally, it was stated that the process of Early Public Notification commenced in September 1992 with publications in local newspapers followed by public meetings organized by Westcoast in the area, and served to inform the local parties likely to be affected by the project.

Views of the Board

In considering this issue, the Board notes that on 10 March 1993 the Directions on Procedure for Hearing Order GH-1-93 were issued. Those Directions on Procedure established the timetable of events, including the deadline for the filing of interventions which was set at 23 March 1993. As well, this timetable established the deadline for the filing of evidence by Intervenors as 1 April 1993, and for the filing of written comments on environmental review matters as 6 April 1993.

The Board acknowledges the point raised by several intervenors that the Notice of Public Hearing, which was published by Westcoast pursuant to the Directions of Procedure, allowed only a short time frame for the preparation and filing of interventions. However, the Board wishes to make clear that the preparation of an intervention is not an onerous task, in that all that is required of a party intending to intervene is the filing of a letter indicating that intention along with that party's name, mailing address, a brief description of the nature of that party's interest in the proceedings and a clear statement of the issues that the party intends to address at the hearing.

Moreover, the Board points out that in order to facilitate interested parties' understanding of the procedures in this hearing, the Notice of Public Hearing also contained the telephone numbers of a contact person at the Board and at the Applicant if further information was required. The Board agrees that it is unfortunate that Westcoast's publication of the Notice did not appear in local newspapers at an earlier date. The Board, however, was not persuaded that the timing of that notice affected the ability of any party to fully participate in the proceedings. Specifically, with respect to the RMEC and Mr. R.E. Wolf, each party had for all intents and purposes from 18 March 1993, the date of publication of the Notice in a Calgary newspaper, to 5 May 1993, the date of the commencement of the hearing, to prepare their submissions and arguments for presentation at the hearing. Indeed, the Board has always

demonstrated flexibility in accepting late interventions and filings of submissions and has in fact granted late intervenor status in the GH-1-93 proceedings where requested. Consequently, no party seeking intervenor status in these proceedings was denied that request.

Finally, the Board believes that through the Early Public Notification Process, which began as early as September 1992, those parties most likely to be affected by the proposed facilities would have been aware of the applicant's plans. The Board recognizes that this process was focussed primarily in the local areas and was not a blanket process which extended provincially or beyond the B.C. borders. However, on the basis of the evidence submitted in support of the Early Public Notification Process, the Board is satisfied that all parties likely to be affected by the proposed facilities had been informed of the planned expansion well in advance of the filing of the application on 19 January 1993.

1.3.2 Complexity of the Application

In support of the motions for adjournment, it was stated that the application involves both financial expenditures in excess of \$300 million and highly technical issues. It was argued that the public does not have the resources or the expertise to address those issues. The fact that the applicant and proponents of the application do have at their disposal highly trained and qualified people was viewed as being unfair and unbalanced. Contrary arguments presented on this issue stated that although a gas plant is a highly technical operation, the technology is well-known and has been in use for some 40 years. Additionally, it was pointed out that the applied-for gas plant facilities, rather than being grass-roots facilities, are an expansion to existing facilities which already have the availability of a developed site.

Views of the Board

In considering this issue, the Board did not find that the technical nature of the gas plant expansion itself created a need for an extended review period. The application, which was filed 15 weeks in advance of the hearing, contained essential information regarding the design of the applied-for facilities. Intensive review of that submission was undertaken by several governmental bodies including the National Energy Board. In addition, follow-up information requests were addressed to Westcoast, as required, which were subsequently responded to in a satisfactory manner by the Applicant.

1.3.3 Completeness of the Application

In support of the motions for adjournment, another point raised and argued was the view that the application was incomplete. To substantiate this position, the RMEC presented arguments to the effect that some environmental studies had not yet been completed. In particular, the studies relating to baseline fisheries studies, and the very limited amount of text dedicated by the Applicant to the impacts of the pipeline elements of the project on grizzly bears and black bears were cited as deficiencies. It was argued that without this information, a finding under the *Environmental Assessment and Review Process Guidelines Order* ("EARP Guidelines Order") could not be made. It was also argued that because some studies were not yet available, intervenors were prevented from filing a full and informed opposition to the application pursuant to subsections 11(1) and (2) of the *National Energy Board Rules of Practice and Procedures* thereby effectively neutralizing their rights as intervenors.

Mr. R.E. Wolf's representative supported the RMEC grounds for adjournment and added that the application was further incomplete because it did not address security of gas supply matters. It was also submitted that the application was incomplete given that it failed to address in the environmental assessment the cumulative effects of future gas wells, drilling programs and the exploitation and depletion of a non-renewable resource.

Countering these points, it was argued that the application was complete and that it was clear that the project itself could proceed in an environmentally acceptable manner. It was further argued that the outstanding studies were simply to confirm findings and finalize construction techniques, and were not required to assess the environmental implications of the project. Moreover, it was submitted that the determination of whether deficiencies in the environmental information existed was an assessment which could not be made until the Board had heard all the evidence including that submitted during the hearing.

Views of the Board

On the basis of these arguments, the Board decided that the most effective way to assess the adequacy of the information was to proceed with the evidentiary portion of the hearing. Whether deficiencies with the application would be sufficient to prevent the completion of an assessment, whether the evidence was sufficient to demonstrate that the project could be constructed in an environmentally acceptable fashion, and whether mitigation with known technology could be assured, could only be deduced once the Board had heard all of the Applicant's case.

With respect to the argument that the absence of an assessment of security of supply issues constitutes a deficiency in the application, the Board notes that this application was filed pursuant to Part III of the Act. Part III of the Act outlines the requirements to be met for the construction and operation of pipelines, which includes consideration of the availability of supply to ensure the viability and feasibility of the proposed facilities. Part VI of the Act deals with the licensing of energy exports and imports matters whereby security of supply issues are examined. Accordingly, security of supply issues were not examined by the Board in the context of this Part III facilities application, and as such the application was not considered to be deficient in this regard.

With respect to the issue of the cumulative impacts associated with future drilling activity, exploration and development in British Columbia, this relates to matters falling within provincial authority and are not under the Board's jurisdiction. A detailed discussion of the Board's assessment of the environmental evidence on those matters under the Board's jurisdiction is contained in Chapter 5.

1.3.4 EARP Guidelines Order, Section 16

It was argued that, in accordance with section 16 of the EARP Guidelines Order, the Board had not established, in consultation with the Federal Environmental Assessment and Review Office ("FEARO") written procedures that would be followed in making a determination under section 12 of that Guidelines Order, and, as such, had no criteria by which to define "significant" or "insignificant" effects. Given that section 16 is a necessary condition in order to consider any questions of "significance", the RMEC stated that it was unable to respond to the application as the definition had not been elaborated by the Board as required by the

EARP Guidelines Order. Accordingly, it was argued that until those criteria are filed with FEARO, as a matter of law, there is a deficiency supporting the motions to adjourn.

Views of the Board

The Board notes that in support of the motions to adjourn, the intervenors stated that the Board has not established written procedures in consultation with FEARO thereby preventing intervenors from effectively participating in the hearing process. The Board wishes to clarify that it has established procedures for screening in consultation with FEARO. Pursuant to those procedures, the Board does use criteria for the screening of projects to enable it to categorize the projects in section 12 of the EARP Guidelines Order. The applied-for facilities do not fall within the automatic exclusion list. As such, an environmental screening would be required, and the test for determining whether the potentially adverse environmental effects of a project would be significant, insignificant or mitigable with known technology, is an objective one. Within the Board's public hearing process nothing prevented the intervenors from leading their own evidence and questioning the environmental effects. As such, the Board views this argument in support of the motion for adjournment as being without merit.

Ruling

After listening to the parties' arguments and submissions, the Board denied the motions for adjournment in a ruling which reads as follows in the transcripts at page 103:

"...[T]he Board takes its environmental responsibilities seriously, and any Applicant or Intervenor who thinks otherwise is ill-advised.

The Board denies the motions to adjourn. The Board has decided that the process of notifying the public, including the Early Public Notification program, has been sufficient. We will proceed with the hearing. The Applicant's complete environmental evidence, submitted to cross-examination pursuant to the NEB Act, will enable the Board to make a finding pursuant to the EARP Guidelines Order."

On the basis of this ruling, the Board proceeded with the evidentiary portion of the hearing.

1.4 Request for Subpoena

By letter dated 26 April 1993, the RMEC requested that the Board subpoena a Mr. Brian Churchill, a registered professional biologist with the British Columbia Ministry of Environment, Lands and Parks ("MELP"), to provide evidence with regard to the adequacy of the application and the likely adverse effects of the proposed project on wildlife in the project area with specific regard to grizzly bears. In support of its request, the RMEC argued that due to the complexity of the issues and its lack of expertise and of resources, the RMEC required Mr. Churchill to come forward and provide evidence with regard to the issues raised.

Ruling

The request for a subpoena was denied given that the Board was not satisfied that a *prima facie* case had been established demonstrating that Mr. Churchill's evidence would be pertinent and necessary in the context of the proceedings.

Gas Supply

2.1 Established Reserves

Westcoast provided estimates of established gas reserves to demonstrate the adequacy of overall gas supply in the Pine River supply area. Gas volumes in formations deeper than the Halfway Formation were not included since tests have not been sufficiently conclusive to establish the economic viability of such formations. As shown in Table 2-1, the Board's estimate of established reserves is approximately 10 percent higher than that of Westcoast's.

TABLE 2-1
Comparison of Estimates of Remaining Established Reserves
and Undiscovered Potential¹
 10^9m^3 (Tcf)

	Westcoast	NEB
Remaining Established Reserves	29.5 (1.0)	31.6 (1.1)
Undiscovered Potential	<u>170.6 (6.0)</u>	<u>138.8 (4.9)</u>
Total	200.1 (7.0)	170.4 (6.0)

¹ As of 31 December 1992

Westcoast assigned estimates of established gas reserves to 61 pools in 11 catchment areas. Approximately 60 percent of the pools were assigned estimates of reserves using volumetric methods; however, due to the complex nature of the structures, Westcoast acknowledged that errors could result. For producing pools, representing the remaining 40 percent, Westcoast relied on analysis of production decline and material balance to establish estimates of reserves.

In its analysis of gas supply, the Board prefers to employ material balance or production decline calculations to determine its estimates of established reserves. If sufficient performance data is not available, then volumetric analysis is used. The Board recognizes that there is a limited amount of data available to conduct material balance analysis. However, the nature of the pools is such that a volumetric analysis gives a less certain result. Based on its analysis, the Board's estimate of established reserves is slightly higher than Westcoast's

estimate due to the combined effect of differing interpretations of reservoir parameters such as net pay and area in many of the pools.

2.2 Undiscovered Potential

In addition to estimates of established reserves, Westcoast assigned an estimate of remaining undiscovered gas potential of $170.6 \text{ } 10^9 \text{m}^3$ (6.0 Tcf) within the Pine River Plant supply area. (refer to Table 2-1)

In developing its estimate of undiscovered potential for the Pardonet and Baldonnel Formations, Westcoast assigned gas potential to existing structures with flow tests, seismically defined structures and unidentified trend gas. Much of Westcoast's undiscovered potential is based on volumetric estimates of reserves in structures that were identified from seismic and play maps.

The Board developed a range of estimates for undiscovered potential in the Pine River Plant supply area. The Board's range of estimates is based on its independent assessment of undiscovered potential for the Pardonet-Baldonnel play. The Board's analysis involved deterministic and stochastic methods using available data (including areal distribution of known pools, pool sizes, success rates, the type of structural trap, and acid gas composition) to develop its estimates of undiscovered potential in the undrilled areas. In establishing its range of estimates, the Board recognizes the uncertainty associated with estimates of this nature, both in terms of volumes that will be found and the composition of the gas that is to be found.

Westcoast identified nine catchment areas that were each assigned potential additions based on pool extensions and undrilled seismically defined structures. Westcoast's remaining potential of $114 \text{ } 10^9 \text{m}^3$ (4.0 Tcf) for these areas is similar to the Board's estimate of undiscovered potential of $122 \text{ } 10^9 \text{m}^3$ (4.3 Tcf), taken at the statistical mean at 44 percent probability, for the same nine areas. Westcoast's estimate of $56 \text{ } 10^9 \text{m}^3$ (2.0 Tcf) from the three remaining catchment areas (Falls, Carbon Creek and Stone Creek) are considered by the Board to be highly speculative at this time. The Board's estimate for these three remaining catchment areas is $16 \text{ } 10^9 \text{m}^3$ (0.6 Tcf) at the statistical mean.

In developing its range of estimates of remaining potential for all areas, the Board considers a reasonable range for estimates of remaining undiscovered potential for the supply area to be $71 \text{ } 10^9 \text{m}^3$ (2.5 Tcf) to $198 \text{ } 10^9 \text{m}^3$ (7.0 Tcf) taken at 95 percent probability and 5 percent respectively. The Board notes that Westcoast's estimate falls within this range.

2.3 Productive Capacity

Westcoast's estimate of productive capacity is drawn from three categories - producing, non-producing, and potential. Figure 2-1 compares Westcoast's estimate of the productive capacity from each of these categories with the current and the expanded plant capacity. In developing its projections, Westcoast stated that a portion of the undiscovered potential in the area would be developed in order to meet the proposed expanded plant capacity starting in 1995, followed by an additional planned expansion in 1997.

Figure 2-1
Westcoast's Projection of Productive Capacity
For the Pine River Supply Area

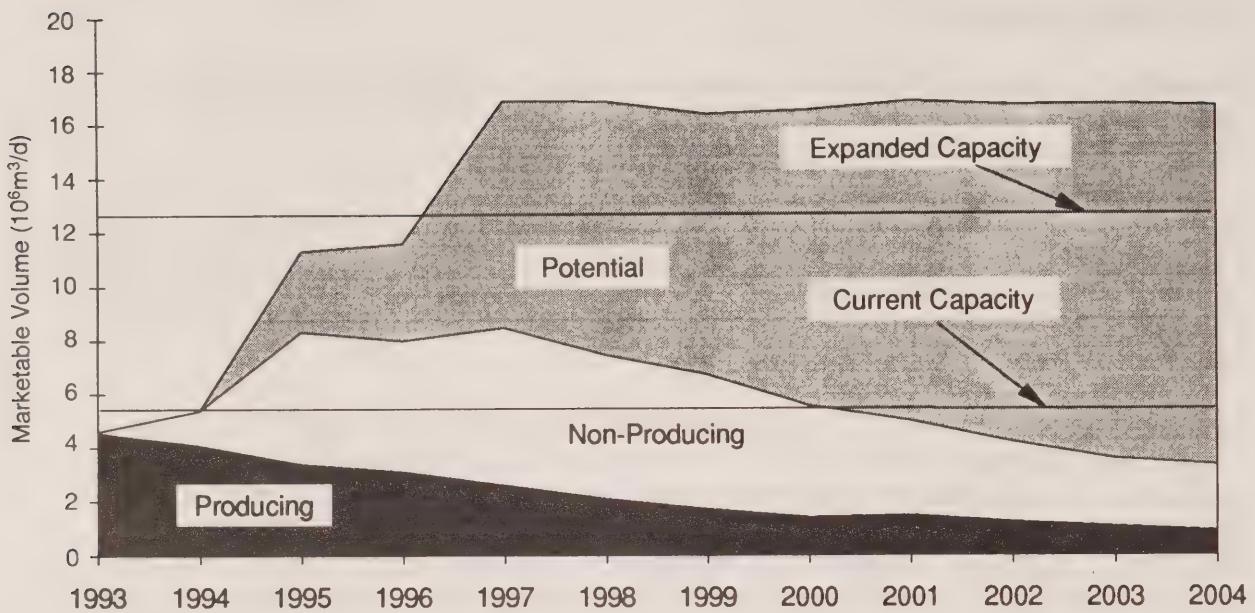


Figure 2-2
NEB's Projection of Productive Capacity
For the Pine River Supply Area

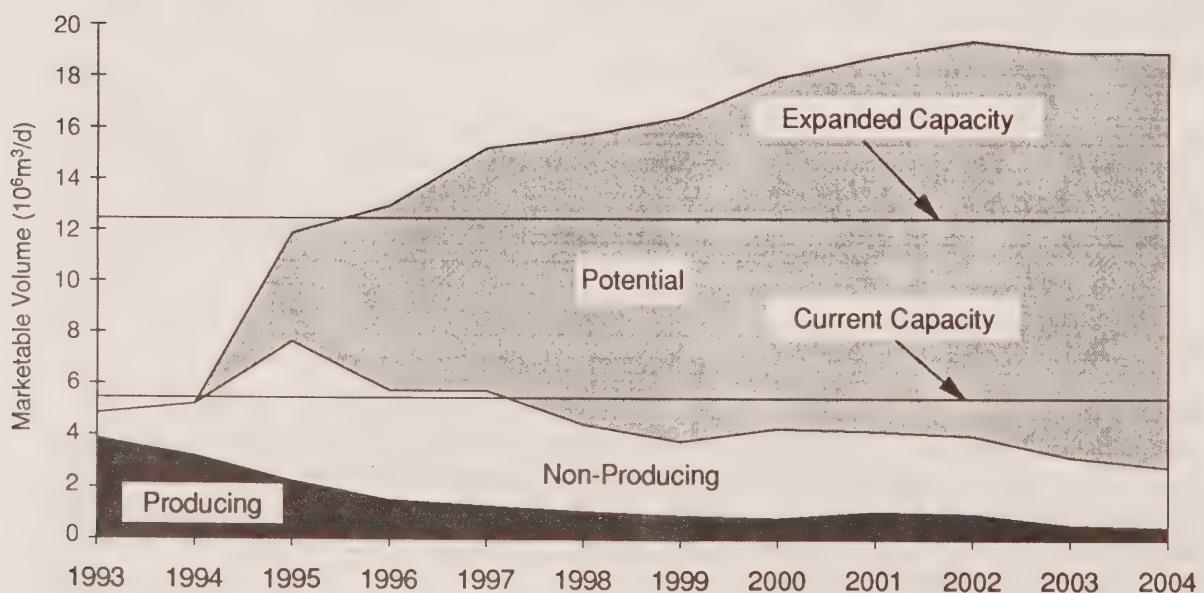


Figure 2-2 compares the Board's productive capacity estimates for each of the three categories; producing, non-producing, and potential; with the current and expanded plant capacity. Both the Board's and Westcoast's estimates of total productive capacity show that the productive capacity will exceed the expanded plant capacity after 1994. The Board's estimate of productive capacity from established reserves is lower than Westcoast's estimate. The Board expects that 100 10^9m^3 (3.5 Tcf) of the undiscovered potential could be added over the next 15 years. Given these reserves additions, the Board expects that adequate productive capacity would be available to fully utilize the proposed expanded plant capacity.

Expansion shippers indicated there is a close relationship among exploration, production and marketing due to the high costs of development in the Pine River supply area. This linkage is essential in order to continue development of the area. Forecasts of future drilling activity from all the shippers, excepting CanWest, appear to support Westcoast's estimate of 40 successful gas wells required to be completed from 1993 to 2004. The expansion shippers also supported Westcoast's estimates regarding acid gas content and expressed confidence that economics would favour long term use of the expanded facilities even if increased acidity led to curtailments or additional tail gas clean-up facilities.

2.4 Views of the Board

The Board's and Westcoast's estimates of established reserves are similar. The Board notes that the expansion of the Pine River Plant is basically reliant upon undiscovered potential, which is by nature speculative, both in terms of volumes that will be found and the composition of the gas that will be found. Westcoast's estimate of undiscovered potential falls within a range the Board considers reasonable. In developing the undiscovered potential, the Board notes that even if drilling activity is lower than forecasted, additions from undiscovered potential should be sufficient to achieve the level of reserves additions necessary to maintain full utilization of the expanded plant.

Requirements

3.1 Service Agreements and Project-specific Markets

3.1.1 Service Agreements

In support of its application, Westcoast filed executed ten-year firm service agreements for Raw Gas Transmission Service and Treatment Service totalling $12\ 999.6\ 10^3\text{m}^3/\text{d}$ (458.9 MMcf/d) and $10\ 434.2\ 10^3\text{m}^3/\text{d}$ (368.3 MMcf/d), respectively. (Refer to Table 3-1)

Westcoast explained that following completion of the proposed expansion, it will be able to provide only partial service to Petro-Canada, Talisman and Shell for the total volumes identified in their respective raw gas transmission and treatment service agreements.

Westcoast noted that as of 23 March 1993, the queue for raw gas transmission service behind the Pine River Plant was comprised of service requests totalling $41\ 064.7\ 10^3\text{m}^3/\text{d}$ (1 449.6 MMcf/d). Similarly, Westcoast noted that as of that same date, the queue for treatment service at the Pine River Plant was comprised of service requests totalling $24\ 955.0\ 10^3\text{m}^3/\text{d}$ (881.0 MMcf/d).

In support of its proposed Pine River Plant expansion, Westcoast submitted that the existing Pine River Plant shippers had agreed to extend a portion of their existing treatment service agreements to five years. Westcoast noted that most of those agreements had one-year terms. The portion of the existing treatment service to be extended to five years will be equivalent to the amount of treatment service contracted for by each of those shippers in conjunction with the expansion. Westcoast explained that the five-year extension will be effective from the later of 1 November 1994 or when the expansion treatment service becomes available. Westcoast noted that after the extension of existing treatment service, the average term of service at the Pine River Plant following completion of the expansion will be 7.1 years, a significant increase from the existing average term of 1.2 years.

3.1.2 Project-specific Markets

CanWest Gas Supply Inc. ("CanWest") is a company owned by a group of gas producers with whom it has entered into gas sales contracts. CanWest indicated that the gas to be transported and processed through the expanded Pine River Plant facilities has not been targeted to a specific market but will instead form part of its gas supply pool. CanWest explained that the new supply is required to supplement its existing contracted reserves which are subject to a natural decline in deliverability over time. CanWest noted that it currently holds sufficient downstream pipeline capacity on the Westcoast system and that it has in place all of the required Canadian and U.S. regulatory approvals.

TABLE 3-1
Service Agreements

	Raw Gas Transmission ^{(1) (2)}		Treatment ^{(1) (3)}	
	(10 ³ m ³ /d)	(MMcf/d)	(10 ³ m ³ /d)	(MMcf/d)
CanWest Gas Supply Inc.	1 013.1	35.8	708.2	25.0
Norcen Energy Resources Ltd.	233.0	8.2	200.0	7.1
Ocelot Energy Inc.	1 635.0	57.7	1 222.0	43.1
Petro-Canada Resources	3 155.9	111.4	2 600.0	91.8
Sceptre Resources Limited	538.9	19.0	402.0	14.2
Shell Canada Limited	2 904.8	102.5	2 436.0	86.0
Talisman Energy Inc.	3 518.9	124.2	2 866.0	101.2
TOTAL	12 999.6	458.9	10 434.2	368.3

⁽¹⁾ All service agreements commence on the later of: (1) the day Westcoast is capable of providing service; and (2) 1 November 1994.

⁽²⁾ All Raw Gas Transmission Service Agreements expire on the earlier of: (1) the last day of the minimum term over which Westcoast will provide such service without imposing a demand toll surcharge; and (2) the last day of the estimated reserve life of the field from which the shipper will deliver the gas.

⁽³⁾ All Treatment Service Agreements expire on 31 October 2004.

Norcen Energy Resources Limited ("Norcen") indicated that it has contracted its reserves in the Thunder Creek area behind the Pine River Plant to CanWest under the terms of a long-term, reserve-based gas sales agreement. The agreement provides that Norcen will deliver its Thunder Creek supply at the inlet to Westcoast's raw gas transmission system.

Ocelot Energy Inc. ("Ocelot") submitted that it has contracted to assign $656 \text{ } 10^3 \text{m}^3/\text{d}$ (23.2 MMcf/d) of the $1 \text{ } 222.0 \text{ } 10^3 \text{m}^3/\text{d}$ (43.1 MMcf/d) of new Pine River Plant expansion capacity to Shell Canada Limited ("Shell") to serve Shell's incremental markets. Ocelot added that it is currently negotiating with two electric cogeneration sponsors for the sale of $424.5 \text{ } 10^3 \text{m}^3/\text{d}$ (15.0 MMcf/d) over a fifteen-year term. Both projects are to be located in the U.S. Pacific Northwest. In addition, Ocelot is finalizing a short-term arrangement (i.e. three and one half years) to supply $141.0 \text{ } 10^3 \text{m}^3/\text{d}$ (5.0 MMcf/d) to an industrial customer located in the U.S. Pacific Northwest. Ocelot noted that, upon the conclusion of this short-term arrangement, it anticipates that additional long-term domestic or export LDC or electrical cogeneration markets will be found.

Ocelot explained that it has executed a ten-year firm service agreement for Transportation Service - Southern which underpins Westcoast's 1993 Southern Mainline Looping and Station 4B Compressor Section 58 facilities application¹ ("1993 Southern Mainline Looping"). The new service will be in addition to Westcoast capacity which Ocelot has already contracted for. Ocelot indicated that its U.S. customers have contracted for sufficient downstream U.S. pipeline capacity and that all required Canadian and U.S. regulatory approvals will be applied for as gas sales arrangements are finalized.

Petro-Canada Resources ("Petro-Canada") submitted that it currently serves B.C., U.S. Pacific Northwest, and California markets totalling $3 \text{ } 724.0 \text{ } 10^3 \text{m}^3/\text{d}$ (131.5 MMcf/d) and that the new gas supply to be made available through the Pine River Plant expansion will serve to replace natural declines in the existing Petro-Canada and Amoco Canada Petroleum Company Ltd. ("Amoco") supply areas. Petro-Canada indicated that, more importantly, the new gas plant capacity will allow it and Amoco to commercialize their respective Murray and Sukunka gas supply. In this regard, Petro-Canada added that both companies have been actively pursuing various incremental and displacement market opportunities in B.C. and in the U.S. Pacific Northwest totalling from $1 \text{ } 416.5 \text{ } 10^3 \text{m}^3/\text{d}$ (50.0 MMcf/d) to $2 \text{ } 116.5 \text{ } 10^3 \text{m}^3/\text{d}$ (74.7 MMcf/d).

Petro-Canada noted that it has executed a ten-year firm service agreement for Transportation Service - Southern which underpins Westcoast's 1993 Southern Mainline Looping facilities application. This new service will be in addition to Westcoast capacity which Petro-Canada and Amoco currently hold. Petro-Canada indicated that all required Canadian and U.S. regulatory approvals are either in place or will be applied for as markets are identified and as gas sales arrangements are finalized.

Sceptre Resources Limited ("Sceptre") indicated that it is actively pursuing opportunities in the B.C. and U.S. Pacific Northwest markets. While it has not yet finalized any gas sales arrangements, Sceptre expressed confidence that significant opportunities exist for its incremental gas supply in the LDC, industrial, and power generation market sectors. Sceptre

¹ This application, which had been filed by Westcoast on 21 December 1992, was approved by the Board by Order XG-W5-19-93 dated 27 May 1993.

noted that it has executed a ten-year firm service agreement for Transportation Service - Southern which underpins Westcoast's 1993 Southern Mainline Looping facilities application.

Shell submitted that its full expansion volume will be used to supply an electrical cogeneration facility currently under construction in the U.S. Pacific Northwest and expected to be onstream in the first quarter of 1994. Shell indicated that a bridging supply arrangement will be entered into for the period prior to the 1 November 1994 in-service date of the Pine River Plant expansion.

Shell noted that the electrical cogeneration facility constitutes a new seventeen-year incremental market which will be served using Westcoast capacity already contracted to Shell. Downstream of the Huntingdon, B.C. export point, the gas will be directly transported to the cogeneration facility through the pipeline facilities proposed to be constructed by Cascade Natural Gas Corporation. Shell noted that all required regulatory approvals are in place or will be in place to allow the gas to be exported in the first quarter of 1994.

Talisman Energy Inc ("Talisman"), formerly BP Resources Canada Limited, indicated that, together with its partner Amoco, it requires the expanded Pine River Plant capacity to commercialize their gas supply. Talisman indicated that, with Amoco, it intends to market the new gas supply in various incremental and displacement LDC, industrial and cogeneration markets in Canada and in the U.S. Pacific Northwest.

Talisman noted that it has executed a ten-year firm service agreement for Transportation Service - Southern commencing 1 November 1993 which underpins Westcoast's 1993 Southern Mainline Looping facilities application.

3.2 Overall Market Requirements and U.S. Downstream Facility Expansions

Westcoast provided a macro forecast of deliveries to the domestic and export markets served off its system for the ten-year period commencing 1 January 1993 and ending 31 December 2002 (Refer to Table 3-2), which indicated that:

- (a) annual domestic deliveries are forecast to increase from $6\ 685\ 10^6\text{m}^3$ (236 Bcf) to $8\ 698\ 10^6\text{m}^3$ (307 Bcf);
- (b) annual export deliveries are forecast to increase from $8\ 017\ 10^6\text{m}^3$ (283 Bcf) to $10\ 425\ 10^6\text{m}^3$ (368 Bcf); and accordingly
- (c) total annual domestic and export deliveries are forecast to increase from $14\ 702\ 10^6\text{m}^3$ (519 Bcf) to $19\ 122\ 10^6\text{m}^3$ (675 Bcf).

TABLE 3-2
Overall Market Forecast
 10^6m^3 (Bcf)

Calendar Year	1992		1993		1995		2002	
Domestic								
Zone 3 ⁽²⁾	255	(9)	255	(9)	255	(9)	255	(9)
Pacific Northern Gas Ltd. ⁽³⁾	935	(33)	991	(35)	1133	(40)	1275	(45)
B.C. Gas ⁽⁴⁾	4079	(144)	4447	(157)	4759	(168)	5694	(201)
Pacific Coast Energy Corporation ⁽⁵⁾	482	(17)	567	(20)	652	(23)	737	(26)
Electric Generation ⁽⁶⁾	452	(16)	425	(15)	623	(22)	737	(26)
Total Domestic	6203	(219)	6685	(236)	7422	262	8698	(307)
Export								
NOVA/Gordondale ⁽⁷⁾	708	(25)	1048	(37)	1190	(42)	1190	(42)
Pacific Northwest								
Northwest Pipeline ⁽⁸⁾	5354	(189)	5212	(184)	5467	(193)	6289	(222)
Ferndale Pipeline ⁽⁹⁾	170	(6)	170	(6)	170	(6)	170	(6)
Electric Generation ⁽¹⁰⁾	510	(18)	567	(20)	1076	(38)	1756	(62)
Total Pacific Northwest	6034	(213)	5949	(210)	6713	(237)	8215	(290)
Off-system ⁽¹¹⁾	1048	(37)	1020	(36)	1020	(36)	1020	(36)
Total Export	7790	(275)	8017	(283)	8923	(315)	10425	(368)
Total Domestic and Export	13993	(494)	14702	(519)	16345	(577)	19122	(675)

Source: Application, Tab 4, Tables 4-3 and 4-4.

Notes

⁽¹⁾ Actuals

⁽²⁾ Gas deliveries to LDCs serving the Fort Nelson, Fort St. John, Dawson Creek and Tumbler Ridge areas, as well, as industrial customers directly connected to the Westcoast system in northeastern B.C.

⁽³⁾ Serves north-central and northwest B.C. Over 83 percent of Pacific Northern Gas's throughput is to industrial customers (e.g. mining, smelting, and pulp and paper). Growth in this market sector is attributable to the increase demand of the Methanex Corporation methanol plant at Kitimat, B.C. and to the growth in gas demand in the forest products sector.

⁽⁴⁾ The interior and coastal divisions of BC Gas serve central B.C., the Greater Vancouver and the Lower Fraser Valley areas, respectively. Significant annual market growth is forecast over the forecast period primarily on the strength of the highly temperature sensitive core market sector expansion. The forecast has made allowance for imports of U.S.-sourced gas via the Huntingdon International Pipeline Company/Sumas International Pipeline Inc. pipeline facilities.

⁽⁵⁾ Provides mainline gas transmission service to pulp and paper mills and core market customers along the B.C. Sunshine Coast and to Vancouver Island from Campbell River to Victoria, including Port Alberni.

⁽⁶⁾ Gas demand associated with the Burrard Thermal Station and with the McMahon Cogeneration Plant at Taylor, B.C., which is expected to be in service in 1993.

⁽⁷⁾ Gas deliveries to serve markets in northern California, eastern Canada and the eastern U.S.

⁽⁸⁾ Serves system markets consisting of LDCs, industrial, and other customers situated in the States of Washington, Idaho, Nevada, Utah, Wyoming and Colorado dependent on the Northwest system for their gas supply. In addition to the Canadian sourced-gas, Northwest receives U.S. gas supply from fields located in Wyoming, Utah, Colorado, and New Mexico.

⁽⁹⁾ Directly connects the ARCO oil refinery and the Intalco aluminum smelter at Cherry Point, Washington with the Westcoast system at Huntingdon, B.C.

⁽¹⁰⁾ Gas demand associated with existing or planned electric power generating facilities (i.e. gas-fired cogeneration and combustion turbine facilities) located within Northwest's on-system market area.

⁽¹¹⁾ Gas which is transported on the Northwest system for delivery to interconnecting pipeline systems for consumption to downstream U.S. markets, including gas delivered to California via the Kern River Gas Transmission Company system.

Westcoast submitted that its macro forecast was prepared on the basis of the market-specific forecasts provided by the domestic and U.S. LDCs served off its system. In addition, Westcoast relied on its own assessment of potential gas demand for those domestic and export market segments not included in the aforementioned LDC forecasts and took into consideration historical gas market data and other available domestic and export demand forecasts. Westcoast noted that it continually updates its forecast through ongoing discussions with its shippers, Canadian LDCs, Northwest, major electric power generators, U.S. LDCs, and with U.S. shippers using the connecting Northwest Pipeline Corporation ("Northwest") and Kern River Gas Transmission Company ("Kern River") pipeline systems to serve southern California.

Westcoast submitted that the executed long-term firm service agreements, its long-term macro market forecast, and the project-specific market and contractual information provided by the expansion shippers, demonstrate that the applied-for facilities are required to serve viable, long-term domestic and export markets commencing 1 November 1994.

With respect to the issue of U.S. downstream facility expansions, Westcoast submitted that its macro forecast includes an allowance for gas delivered to Northwest at Huntingdon, B.C. which is subsequently redelivered to downstream interconnecting pipelines (Refer to Table 3-2 "Off-system"). Westcoast noted that it has forecast annual deliveries of $1\ 020\ 10^6\text{m}^3$ (36 Bcf) in each of the years over the forecast period.

Westcoast explained that, while historically approximately $765\ 10^6\text{m}^3$ (27 Bcf) of the total $1\ 020\ 10^6\text{m}^3$ (36 Bcf) was delivered to the Kern River system each year, the remaining volume was delivered to markets served by Colorado Interstate Gas Co., El Paso Natural Gas Company ("El Paso"), Pacific Gas Transmission Company ("PGT") and Transwestern Pipeline Company ("Transwestern"). Westcoast's current macro forecast only makes allowance for gas delivered to Kern River under firm service agreements held by shippers for the delivery of gas from the Huntingdon/Sumas receipt point on Northwest to the Kern River delivery point. Westcoast noted that, to the extent deliveries are made to downstream pipeline systems other than Kern River, its market forecast is understated.

In addition, Westcoast's forecast for off-system sales does not include some $1\ 048\ 10^6\text{m}^3$ (37 Bcf) of annual deliveries to PGT, Kern River, El Paso and Transwestern systems associated with the Northwest Phase 1 Expansion. Westcoast has concluded that it would be prudent to wait until the Northwest expansion has operated for some time so that the off-system forecast associated with that expansion could be based upon actual operating experience.

Westcoast explained that subsequent to the preparation of its market forecast, pipeline facility expansions were announced by: Northwest (Phase 2 Expansion); PGT (Phase 2 Expansion) to serve gas-powered electric generation markets in the U.S. Pacific Northwest; and, by Sierra Pacific Power/TransCanada (i.e. the Tuscarora pipeline) to connect Malin, Oregon to Reno, Nevada. The timing of these announcements precluded Westcoast from accounting for these new U.S. facilities in its market forecast. Westcoast was of the view that until the full details of the aforementioned expansions are known, it would be speculative to estimate their impact on the markets served by the Westcoast system.

Westcoast concluded that, notwithstanding the competition in the export market that would result from these proposed facility expansions, such expansions provide market opportunities for Canadian-sourced gas delivered via the Westcoast system. Westcoast therefore further concluded that these recently-announced expansions, particularly those intended to serve the U.S. Pacific Northwest, do not raise doubts as to the need for its applied-for facilities.

Views of the Board

The Board finds Westcoast's long-term macro forecast of domestic and export markets served off its system to be reasonable for the purpose of assessing the need for the applied-for facilities. The Board continues to be satisfied with Westcoast's approach in developing and continually updating that forecast. The Board notes that no party filed contradictory evidence or questioned the reasonableness of Westcoast's macro market forecast.

The Board concurs with Westcoast that its macro market forecast, coupled with the executed long-term service agreements and the project-specific market and contractual information provided by the expansion shippers, demonstrate that the applied-for facilities are required to serve viable, long-term markets. The Board is satisfied that there is a reasonable assurance that the applied-for facilities will be used and useful over the long-term.

The Board has noted that a number of shippers have executed long-term Raw Gas Transmission Service and Treatment Service Agreements with Westcoast, but that Westcoast has not yet filed for Board approval an application to expand its raw gas transmission and Pine River Plant facilities to meet these requirements.

With respect to the issue of U.S. downstream facilities expansions, the Board concurs with Westcoast that it would be premature to make allowance for such expansions in Westcoast's macro forecast until specific shippers and markets can reasonably be identified.

Facilities

4.1 Overview of the Application

Westcoast applied to modify and expand the existing Pine River Gas Processing Plant and Grizzly Valley Pipeline System in order to increase the volumes of raw gas that may be transported to and processed at that plant. Westcoast explained that the proposed expansion is required to provide additional gas processing capacity to accommodate the Contract Demand Treatment Service which has been requested by shippers (described under Chapter 3 "Requirements"). The expansion is also supported by Westcoast's forecast of deliverability (described under Chapter 2 "Supply") from recoverable gas reserves available for processing at the Pine River Plant.

The proposed expansion of the Pine River Plant would increase the raw gas processing capacity of the plant from $7.37 \text{ } 10^6 \text{m}^3/\text{d}$ (260 MMcf/d) to $15.9 \text{ } 10^6 \text{m}^3/\text{d}$ (560 MMcf/d) commencing 1 November 1994. The residue gas plant capacity would increase from $5.38 \text{ } 10^6 \text{m}^3/\text{d}$ (190 MMcf/d) to $12.5 \text{ } 10^6 \text{m}^3/\text{d}$ (441 MMcf/d), while the sulphur plant capacity would increase from 1097 to 2000 tonnes per day. The expansion would allow Westcoast to provide full and partial service to the expansion shippers in accordance with the firm service agreements discussed in section 3.1.

4.2 Alternatives to Proposed Expansion

Westcoast stated that it considered constructing a new natural gas processing and sulphur recovery complex at a location in the Tumbler Ridge area at kilometre post 37 (mile post 23) on the existing Grizzly Valley Pipeline. Westcoast explained that this option was not pursued for the following reasons:

- i) a plant at the Tumbler Ridge location would require the construction of a new sales gas transmission pipeline to Westcoast's Mainline Compressor Station 4A at an estimated cost of \$127 million, as well as raw gas transmission facilities estimated to cost \$38.9 million, for a total estimated cost of \$415.9 million;
- ii) additional staff would be required and higher operating costs faced at the Tumbler Ridge facility, if built;
- iii) new sulphur pelletizing and shipping facilities would be required;
- iv) by expanding the Pine River facilities, corresponding access to some expandable gas treating capacity would reduce the size of the expansion necessary; and
- v) the environmental impacts associated with expanding the existing plant would be less than with a new plant.

The option of transporting the raw gas to the McMahon Plant for processing was raised by BC Gas. Westcoast explained that the McMahon Plant was designed for processing raw gas streams containing up to 2% H₂S. As the gas from the Pine River area contains an average of 9.3% H₂S, the facilities at McMahon would not be capable of handling such streams without major modifications. Westcoast stated that the total cost associated with the McMahon option would be \$464.9 million.

Views of the Board

The Board is satisfied that the option proposed by Westcoast for handling increased volumes of gas from the area is the most appropriate at this time given the respective costs of the alternatives.

4.3 Pine River Gas Plant Expansion

4.3.1 Description of Facilities

A schematic diagram of the Pine River Gas Plant expansion is presented in Figure 4-1. The expansion includes the following major process units, facilities and modifications:

- Inlet Separation
- Gas Sweetening
- Gas Dehydration
- Waste Disposal
- Modifications to Existing Facilities

Westcoast stated that the existing facilities at the Pine River Plant would be modified in order to maximize the utilization of the existing plant facilities and reduce the size of the new facilities required. The proposed expansion would also include certain utility and auxiliary facilities.

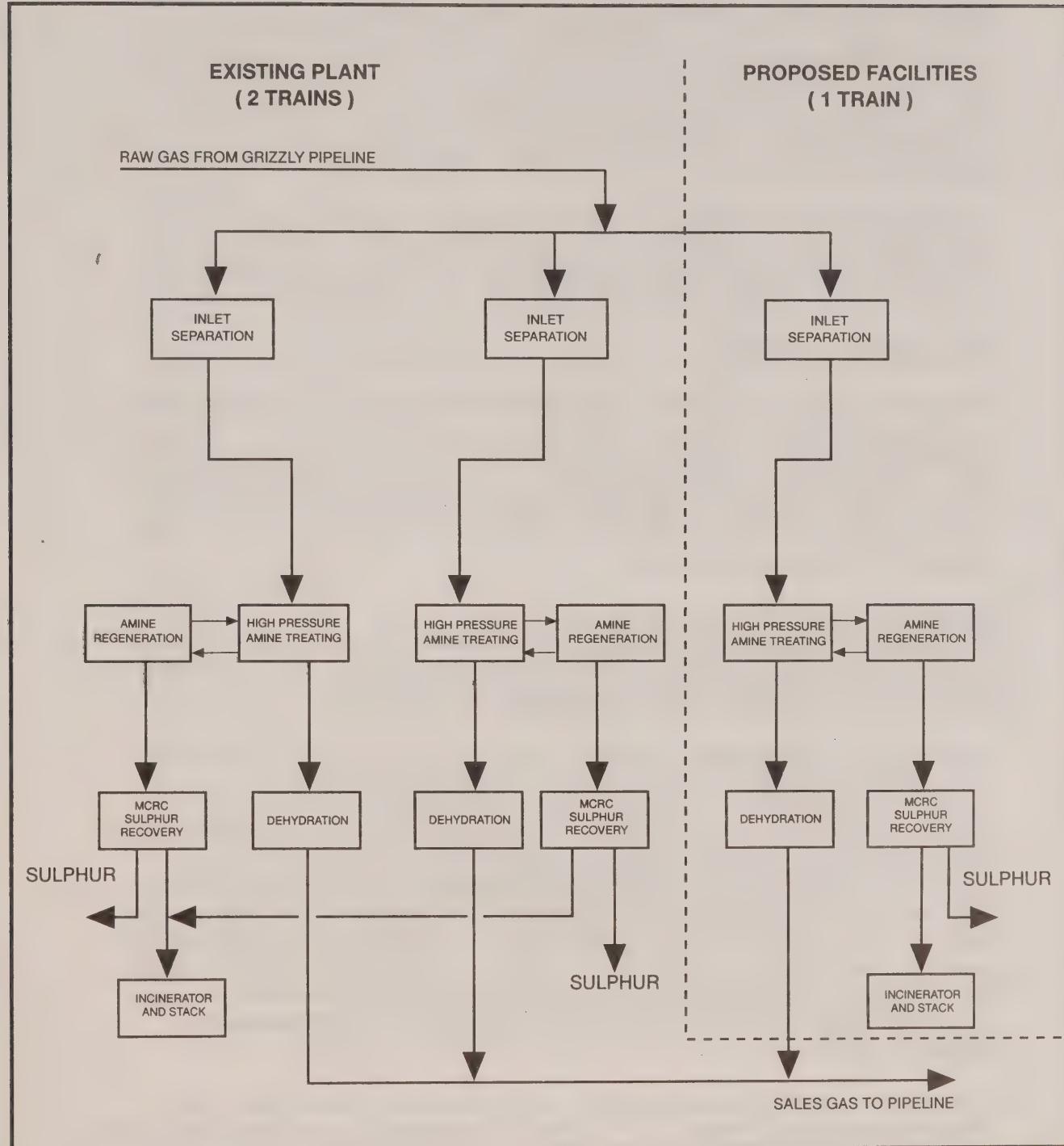
Westcoast explained that the facilities would be designed and constructed in accordance with the requirements of the *National Energy Board Act*, ASME/ANSI B31.3 Chemical Plant and Petroleum Refinery Piping, 1990 edition and B31.1 Power Piping, 1992 edition. Westcoast also explained that pressure vessels would conform to Section VIII of the ASME Boiler and Pressure Vessel Code, 1992 edition.

The capacity of the existing sulphur recovery facilities at the Pine River Plant is 1097 tonnes (1080 long tons). Westcoast explained that the existing sulphur recovery facilities were designed for a sulphur recovery efficiency of 99.25%. Under the proposal, the sulphur plant would be expanded to recover 2000 tonnes (1969 long tons) per day. Westcoast stated that with process optimization and a change of catalyst, the sulphur plant's efficiency could approach 99.5%.

Liquid sulphur from the sulphur plant would flow to liquid sulphur degassing pits. Westcoast stated that it would install the additional equipment necessary to reduce the residual H₂S level in the liquid sulphur to 10 ppm.

Figure 4 - 1
Pine River Plant Expansion
Preliminary Processing Block Diagram

(Based on Figure 5-1 appearing in Volume 1 of Westcoast's section 58 application
 dated 19 January 1993 for the Pine River Plant and Grizzly Pipeline System Expansion)



The proposed 5.5 km (3.4 mile), 168.3 mm (6.63 inch) O.D. liquid sulphur pipeline would transport the sulphur from the storage tanks to the sulphur forming facilities owned and operated by Petrosul. Westcoast explained that if the liquid sulphur pipeline was not built, fifty truck movements per day would be required to transport the daily production of 2000 tonnes of sulphur from the Pine River Plant to the sulphur forming facilities. Westcoast stated that the liquid sulphur in the proposed pipeline would have gravity flow, and that the design capacity could accommodate up to 4080 tonnes/day. The line would be insulated and electrically heat traced to ensure that the sulphur temperature would remain above its solidification temperature of 119°C (246°F). Westcoast also stated that the pipeline would be constructed above ground to facilitate future maintenance, as well as to accommodate the expansion loops required along the pipeline route. Leak detection, isolation block valves, and a system to contain sulphur in the event of a rupture would also be installed.

Westcoast indicated that experience has shown that the liquid sulphur is not expected to be corrosive or erosive. The pipeline would be constructed in accordance with ASME/ANSI B31.3 Chemical Plant and Petroleum Refinery Piping, 1990 edition, as the requirements set forth in this standard are more conservative than those of the CSA pipeline standards.

4.3.2 Sulphur Recovery

Westcoast explained that the proposed daily sulphur production of the plant would be 2000 tonnes per day. The B.C. Ministry of Environment, Lands and Parks ("MELP") has various requirements concerning sulphur emission which become progressively more stringent as the plant capacity increases. At the proposed design capacity of the sulphur plant, MELP would require a minimum quarterly average sulphur recovery efficiency of 98.7%. However, if sulphur production was to exceed 2000 tonnes/day, that recovery efficiency would have to increase to 99.5% on a consistent basis.

Westcoast explained that to meet the increased recovery efficiency a Shell Claus Offgas Treating (SCOT) tail gas cleanup unit would have to be added to each of the two existing processing trains and the new proposed train. The SCOT units would cost approximately \$75-80 million, and would require an 18 month lead time for installation.

Westcoast stated that the proposed expansion would produce less than 2000 tonnes per day total sulphur and is a cautious expansion proposal considering producer requirements but recognizing various regulatory, supply and market issues. Westcoast also stated that the expansion is based on the contracted acid gas volumes, which result in a daily production of 2000 tonnes per day. Westcoast denied that its choice of the size of the expansion was to avoid the requirement of 99.5% sulphur recovery efficiency. Westcoast emphasized that the additional expenditures being proposed would allow an efficiency level that would not only exceed the 98.7% required for a plant of this size, but would approach the level required for plants with daily sulphur production that are in excess of 2000 tonnes. Westcoast submitted that the additional expenditures required to consistently achieve 99.5% recovery efficiency would provide very marginal environmental enhancement given the high incremental expenditure required.

Westcoast explained that the proposed daily sulphur production of 2000 tonnes per day assumes an average H₂S content of 9.3%. If the H₂S percentage increased above that level, the throughput of the plant would need to be curtailed or the additional sulphur recovery

equipment would be required. Westcoast stated that the contracted acid gas composition of each shipper's gas would be monitored and that in the event any shipper exceeds its limits, that particular shipper would face restriction in its residue gas production. Overall, Westcoast stated that it considered the level of the proposed expansion to be consistent with the assessment of available gas supply.

In a jointly-filed letter, the British Columbia Ministries of Energy, Mines and Petroleum Resources and Environment, Lands and Parks (collectively referred to herein as "the Province") stated that they supported the proposed expansion as it would provide a sound basis for future resource development in the area. The Province expressed concern regarding the future sale and disposal of recovered sulphur. Additionally, the Province questioned the choice of sizing of the proposed processing facilities which, at 2000 tonnes of sulphur per day, seemed to be intentionally avoiding more rigorous recovery requirements for larger plants.

The Province noted that Westcoast's analysis may have failed to reflect the highly variable sour gas compositions that are present in the gas reserves assigned to supply the expanded plant raw gas design volume. The Province pointed out the weighted average percentage of H₂S after expansion, as calculated from the data provided by Westcoast, would be 9.98%. At the higher H₂S percentage, the plant would fall short of the contracted residue gas volumes, and/or exceed the proposed 2000 tonnes per day rate of production. The Province submitted that such occurrences could affect the economics of the project.

The expansion shippers were committed to overcoming any of the perceived concerns such as sulphur disposal or costs associated with higher than anticipated H₂S. They stated that the project economics are likely to be favourable even if other constraints come into play over time.

Views of the Board

The Board agrees that given the forecasted supply and market information, as well as the contracted acid gas content, the level of the proposed expansion is appropriate. The Board understands that Westcoast would continue to review the situation of acid gas composition and sulphur recovery as time progresses, and assess the need to further modify the facilities as may be required.

4.4 Grizzly Pipeline System Expansion

Westcoast proposed the construction of additional pipeline facilities in its Grizzly Valley raw gas transmission system to accommodate increased volumes of raw gas to be processed at the expanded Pine River Gas Plant. The following facilities were proposed:

- i) the approximately 8.9 km (5.5 mile) 323.9 mm (12.75 inch) O.D. Chamberlain Pipeline, connecting the Chamberlain field to the South Sukunka Pipeline. The proposed Chamberlain Pipeline is designed for a peak day flow of $2\ 242 \times 10^3 \text{m}^3$ / (79.1 MMcfd);

- ii) the Murray River Pipeline consisting of 24.0 km (14.9 miles) of 323.9 mm (12.75 inch) O.D. pipeline connecting the Murray River field to the existing Grizzly Pipeline. The proposed Murray River Pipeline is designed to handle a peak day flow of $1\ 942 \times 10^3 \text{m}^3/\text{day}$ (68.6 MMcf/d);
- iii) the addition of 15.2 km (9.4 miles) of 610 mm (24 inch) O.D. loop to the existing South Sukunka Pipeline; and
- iv) the addition of approximately 26.6 km (16.5 miles) of 610 mm (24 inch) O.D. loop to the existing Grizzly Pipeline.

Westcoast stated that the pipe to be used for the raw gas transmission would conform to Westcoast specification No. 102 Rev. 49 and the applicable CSA standards. Westcoast also stated that, in keeping with the design of the original Grizzly system, the pipelines would be designed as Class 2 pipelines to afford increased safety in view of the very sour nature of the raw gas being handled.

Westcoast presented the results of a rupture study performed by Bovar Environmental Services. The risk of public exposure to sour gas was addressed in the event of a pipeline rupture. The pipelines would be equipped with automatic line break valves, which would be activated in the event of a pipeline rupture to limit the volume of sour gas released.

Views of the Board

The Board is satisfied that the design of the proposed pipelines meets the regulatory requirements.

4.5 Capital Cost Estimates

Westcoast presented the preliminary estimates for the proposed expansions as shown in Tables 4-1 and 4-2. The cost breakdown shown in Table 4-1 includes \$458,000 for the Pine River Plant Expansion Tie-In facilities which Westcoast applied for separately in its 1993 Section 58 application, Amendment No. 8, dated 5 May 1993.

Westcoast explained that the current cost estimates for the proposed plant expansion were developed by a third party consultant from formal vendor quotations for the major equipment based on equipment data sheets, and specifications for this project. Westcoast submitted that the expected level of accuracy is $\pm 15\%$. Raw gas transmission cost estimates were based on quotes from manufacturers and discussions with contractors. The level of accuracy of the raw gas transmission cost estimates is expected to be $\pm 10\%$.

TABLE 4-1

Summary of Capital Cost Estimates for Pine River Plant Expansion

Description	1993/94 Cost (\$000)
Land and Land Rights	100
Site Development	-
Materials	92,100
Installation	79,000
Engineering, Inspection and Miscellaneous	32,000
TOTAL DIRECT COST	203,300
Overhead and Supervision	3,500
Omissions & Contingency	11,100
AFUDC	14,200
TOTAL COST	232,000

TABLE 4-2

Summary of Capital Cost Estimates for Grizzly Pipeline System Expansion

	Chamberlain Pipeline	Sukunka Loop Pipeline	Grizzly Loop Pipeline	Murray River Pipeline
Land and Land Rights	198	344	606	546
Materials	1,490	4,241	7,130	3,049
Installation	2,744	9,933	15,548	9,066
Start-up	35	102	71	82
Inspection and Miscellaneous	308	430	757	803
Total Direct Cost	4,775	15,050	24,112	13,546
Engineering and Overhead	310	978	1,568	880
Omissions & Contingency	509	1,602	2,568	1,442
AFUDC	84	264	424	238
TOTAL COST	5,678	17,894	28,672	16,106

Views of the Board

The Board notes the efforts of Westcoast to develop cost estimates of the stated levels of accuracy. The Board expects that Westcoast will take all reasonable steps to perform the proposed project within budget. So that it may effectively track cost variances, the Board has decided to include, in any approval order it might issue, a condition requiring Westcoast to submit bimonthly construction progress and cost reports. These reports are to include the completion percentage of each construction activity, a breakdown of costs incurred during the preceding two months, and an update of projected costs to complete the project including an explanation of any significant variances.

Such a condition would also require that Westcoast provide copies of these bimonthly reports to any other party who so requests.

The Board will monitor Westcoast's expenditures in respect of the expansion project and ensure that they are properly justified before being allowed in the Company's rate base.

4.6 Project Management

The Board asked Westcoast to describe in detail how the management, cost and schedule control of the project would be handled. Westcoast stated that it had contracted the engineering design and material procurement for the Pine River Plant expansion to Delta Catalytic Engineering and Construction Ltd. Westcoast itself would act as construction manager during the course of the project, and would also provide overall project management, with each contractor acting as an independent contractor responsible for its contractual arrangements. Westcoast explained that given the diverse and technically challenging nature of the project, it was not feasible to have a single contractor perform the project.

Westcoast stated that it would invite fixed fee/bonus reimbursable type bids for the performance of major civil, mechanical and electrical construction work associated with the project.

Ron Dickson Labour Consulting ("RDLC") stated that the lump sum, open tender, general contract policy is the only method of contracting which fully utilizes the ability of the open market to ensure the lowest total project costs. RDLC also pointed out that with Westcoast's policy of employing several separate reimbursable type bids, its management costs are likely to be excessive as it must supervise so many contractors. RDLC also questioned Westcoast's credentials to perform general construction management.

Views of the Board

The Board is persuaded that given the requirement for an early start of construction of the proposed project, the scope of the project could not be fully defined at the time of bidding, nor could the design engineering be completed at that stage. The Board, therefore, does not believe that a lump-sum type of a contract would be appropriate. The reimbursable type of contracts would allow for more equitable sharing of risks, and prompt start of construction. The Board is satisfied with the approach proposed by Westcoast.

Land Use, Environmental, and Socio-Economic Matters

5.1 Early Public Notification

As part of its application process, and consistent with the Board's *Memorandum of Guidance Concerning Early Public Notification of Proposed Applications*, Westcoast undertook a program of Early Public Notification which began in September 1992 and public consultation which will continue as the project progresses. The Early Public Notification Program consisted of the following:

- A newspaper supplement was published during the week of 20 September 1992 in all communities within the project area in northeastern B.C. to provide information on the proposed expansion project;
- Consultation was carried out with local governments and aboriginal leaders over the period from 16 September 1992 to 26 February 1993 to relate expansion project details and determine public interests and concerns;
- A community meeting was held on 26 January 1993 at Hasler Flats to discuss the proposed expansion plans with local residents. Residents were invited to the meeting by personal letter. A letter summarizing the proceedings and undertakings of the meeting was forwarded to local residents; and
- An open house was held in Chetwynd on 27 January 1993 to explain the expansion project and determine public interests and concerns. The open house was advertised in local newspapers and personal invitations were sent to trappers, guide-outfitters, provincial government agencies, local and regional governments, native bands and individuals who had previously expressed an interest in the project.

Westcoast also indicated in its application that provincial and federal regulatory agencies had been contacted on relevant matters. Follow-up discussions with the Department of Fisheries and Oceans ("DFO") culminated in a letter of commitment from Westcoast to DFO outlining further conditions involving additional studies and specific procedures for fisheries resource protection. Similar discussions with the B.C. Ministry of Environment, Lands and Parks ("MELP") culminated in Westcoast's agreement to additional conditions related to sulphur emissions management and elemental sulphur handling.

Westcoast states that periodic newspaper advertisements or letters to the public answering queries as required will be produced.

Views of the Board

The Board is satisfied that Westcoast has notified and adequately discussed the proposed application with all parties having a direct interest in the project. The Board notes, however, that DFO was not included during the early stages of the consultation process for all aspects of the proposed project. While DFO's concerns have ultimately been addressed, the Board expects that Westcoast will involve DFO at the early planning stage for any future projects.

5.2 Land Use

5.2.1 Route/Site Selection

The Grizzly Pipeline expansion would involve the installation of four segments of buried natural gas pipeline totalling approximately 74.7 km (46.3 miles) in length. These pipelines are shown in Figure 1-2 and further described in section 4.4.

As well, Westcoast has proposed a 5.5 km (3.4 mile) above-ground liquid sulphur pipeline.

The project area is situated in the foothills of the Rocky Mountains, southwest of Chetwynd, B.C. The proposed pipeline projects associated with the Grizzly Pipeline system expansion are located on undeveloped Crown land and primarily encounter three biogeoclimatic zones, namely the Boreal White and Black Spruce zone, the Sub-Boreal Spruce zone and the Engelmann Spruce-Subalpine Fir zone. The Boreal White and Black Spruce zone is encountered in the lower elevation valley bottoms associated with the Sukunka and Murray Rivers, while the Sub-Boreal Spruce zone is generally encountered at low elevations associated with smaller watercourses in the area. Upland areas between these valley bottoms are dominated by the Engelmann Spruce-Subalpine Fir zone. High elevation Alpine Tundra is encountered by the project, but only locally.

The project will result in a surface disturbance to approximately 144.36 hectares (356 acres) of land. To minimize the potential effects from such disturbance, Westcoast undertook a route selection process which evaluated potential conflicts with the important biophysical features and land uses in the area.

Westcoast submitted that the selection of the proposed route location was based on the following criteria:

- (a) Construction/Operation Criteria:
 - (i) tie-in points;
 - (ii) construction/operation difficulties;
 - (iii) access;
 - (iv) future system expansion; and
 - (v) cost.

(b) Biophysical Criteria:

- (i) fish and wildlife; and
- (ii) areas of high environmental sensitivity.

(c) Land Use Considerations:

- (i) land uses;
- (ii) historical resources; and
- (iii) use of existing corridors.

Views of the Board

The Board is satisfied with the route selection criteria adopted by Westcoast as well as Westcoast's approach in applying those criteria in the determination of the proposed pipeline route. The Board finds the general routes proposed by Westcoast to be acceptable.

5.2.2 Land Requirements

Plant Facilities

There will be no requirement for additional land at Westcoast's Pine River Gas Processing Plant, as this facility expansion will be contained within District Lot 1156, Peace River District, which is owned in fee simple by Westcoast.

Pipeline Facilities

The rights-of-way for the Grizzly Pipeline Expansion would be located within unsurveyed Crown lands in the Peace River District. In order to permit the Company to construct, operate and maintain a pipeline within an 18 metre wide right-of-way on Crown lands, Westcoast would apply to MELP for Licences of Occupation. Westcoast anticipated that no difficulties would be encountered in obtaining the required licence. Following construction and final survey, Westcoast would secure a statutory right-of-way from the Province of British Columbia.

The proposed above-ground sulphur pipeline will be located within a right-of-way located immediately adjacent to Westcoast's existing Grizzly Valley sales gas pipeline. The majority of the lands for the proposed sulphur pipeline are Crown Provincial lands with two parcels in the Pine Valley presently under Crown lease to two individuals. The sulphur pipeline will cross only one private parcel of land.

The proposed pipeline rights-of-way are reasonably accessible. All-weather roads from Chetwynd service the Pine River Gas Plant, the Talisman Energy plant sites up the east side of the Sukunka River and the valves and sending/receiving barrels on the Grizzly Valley Pipeline. Access also exists into Shell's wellsite in the Chamberlain area and for portions of the Murray River Pipeline. In most other locations, access will utilize existing pipeline rights-of-way and

seismic trails. Temporary new access will be required only for small segments of difficult terrain on the pipelines.

Views of the Board

The Board finds that Westcoast's anticipated land requirements for pipeline construction, installation and operation are reasonable and justifiable. The Board notes that Westcoast would use existing roads and access routes for access to and along the right-of-way.

As the necessary land rights have yet to be acquired, the Board would require that Westcoast provide evidence that it has secured the necessary authorization for the rights-of-way.

5.3 Environmental Matters

In its application, Westcoast identified a number of environmental and directly-related social effects which could result from construction and operation of the proposed expansion facilities. Those effects and the mitigative measures proposed by Westcoast were presented in its environmental impact assessment and subsequent submissions. Certain site-specific environmental effects and the proposed mitigative measures were discussed during the hearing.

5.3.1 Pine River Gas Plant

5.3.1.1 Air Quality

Westcoast submitted that gaseous emissions associated with the expansion would result in a doubling of emissions of most pollutants. Plant gaseous emissions include sulphur dioxide, nitrogen oxides, hydrogen sulphide, carbon monoxide, carbon dioxide, volatile organic compounds, methane and particulate matter. These emissions could potentially have an adverse effect on air quality.

Westcoast submitted that the potential effects of sulphur dioxide ("SO₂") emissions from the expanded facility were evaluated using a series of numerical dispersion models. Under the worst-case conditions, there is a potential for concentrations of SO₂ in excess of the provincial Level A and federal Desirable 1-hour ambient objective of 450 µg/m³ on elevated terrain features in the area surrounding the plant. The modelling estimated that the ambient objective would be exceeded approximately 124 hours during a year. Westcoast stated that the modelling over-predicts concentrations by as much as a factor of seven in complex terrain and that worst-case meteorological conditions would not likely exist for all the estimated 124 hours. Therefore, the likely number of hours during the year that the ambient objective would be exceeded would be much lower than estimated. Westcoast also stated that the use of local meteorology (were it available), rather than Fort St. John data, would likely reduce the predicted number of hours during which the ambient objective would be exceeded. Local winds would likely push the plume away from terrain features which cause the modelling to predict concentrations in excess of the ambient objective. Westcoast concluded that maximum concentrations of SO₂ are rarely expected to exceed the ambient objective. In those cases when the ambient objective is exceeded, the amount and duration by which the ambient objective is exceeded are not expected to be of a magnitude which would result in any adverse environmental or health effects.

Nitrogen oxide emissions would only increase approximately 25 percent as a result of this expansion. Westcoast's proposed use of Best Achievable Control Technology, as required by MELP, on the new boiler and generators substantially reduces the potential increase in these emissions.

Fugitive hydrogen sulphide emissions pose potential odour concerns for residents of Hasler Flats. Westcoast proposes to install a degassing system and a sulphur pipeline to the Petrosul sulphur pelletizing plant, in order to minimize potential fugitive emissions of hydrogen sulphide. Further, Westcoast has undertaken to monitor current emissions of hydrogen sulphide and investigate options for reducing those emissions at the Petrosul plant.

Particulate matter would be emitted from the thermal oxidizers in the form of salts. These emissions are well below the provincial Level A objective. Westcoast submitted that these emissions are not expected to have any adverse environmental effects.

Carbon dioxide and methane are considered to be greenhouse gases contributing to global warming. Westcoast states that opportunities to offset increased emissions of these gases within the plant expansion project are limited. Westcoast proposes addressing this issue in a broader context and has therefore undertaken, in consultation with MELP, to inventory all greenhouse gas emissions on its system to identify opportunities for reducing these emissions. Westcoast notes that combustion of natural gas by the end user produces less carbon dioxide per unit of energy than any fossil fuel it replaces. This ultimately represents a potential reduction in global emissions.

5.3.1.2 Sulphur Management

The raw gas processed by the Pine River Plant contains varying concentrations of H₂S which must be removed from the gas. The process results in the recovery of elemental sulphur. The handling of elemental sulphur could potentially have an adverse effect on water quality, vegetation, soils and wildlife.

The proposed plant expansion will be designed to process raw H₂S bearing gas such that throughput is limited to 2000 tonnes/day of sulphur. Westcoast states that the expanded plant will have a sulphur recovery efficiency of not less than 99 percent. This is the same as the existing plant's provincial permit allows and exceeds the 98.5 percent efficiency proposed by the Province's draft sulphur recovery guidelines for natural gas processing plants with a throughput of less than 2000 tonnes/day.

Recovered sulphur will be stored in tankage at the plant site pending shipment by pipeline to the Petrosul pelletizing plant. Pelletized sulphur will then be shipped by rail to market by the producers. Soft markets have, in the past, caused the sulphur to be poured to block to await more favourable markets. Westcoast currently retains one sulphur block and has indicated that it will comply with requirements of DFO and MELP, should it become necessary to pour additional sulphur to block. MELP has provided a list of requirements for pouring of sulphur to block.

5.3.1.3 Acidic Deposition

Acidic deposition resulting from the plant emissions could potentially have adverse environmental effects on water bodies, fisheries, soils, and vegetation. Westcoast submitted that the area surrounding the Pine River Gas Plant is a Class 4 region having the lowest sensitivity to acidic deposition as defined by the Western and Northern Canada Interim Acid Deposition Critical Loadings Task Group. This Task Group established critical loadings for wet sulphate deposition of 6 to 15 kg/ha/yr. Acidic deposition modelling conducted by Westcoast predicts a maximum deposition rate for wet sulphate of 3.0 kg/ha/yr. Westcoast submitted that combined background and predicted average acidic deposition rates for wet sulphate are approximately 6.5 kg/ha/yr. This is within the range established by the Task Group for protection of sensitive ecosystems.

5.3.1.4 Water Quality

The proposed plant expansion includes plans to continue disposing of treated plant wastewater effluent under provincial permit via spray irrigation to land adjacent to the plant. This procedure has the potential to adversely affect vegetation, soils, groundwater, surface water, wildlife and fisheries.

Westcoast submitted that the proposed expansion incorporates water reuse and recycling measures which would result in the volume of effluent being treated and applied to the spray irrigation area remaining under the existing provincially permitted level of 13 000 m³/year. Salt loading in the effluent would decrease significantly because the water will be recycled and disposed in the thermal oxidizer. Westcoast studies indicated little or no effects from past irrigation practices. Westcoast proposes to increase the area of land used for spray irrigation by 0.5 hectares to about 1.0 hectare. The proposed increase in land used is intended to reduce irrigation rates and thereby minimize potential impacts to soils, vegetation, groundwater and surface water. Westcoast has undertaken to conduct a field study in 1993 to collect data for use in refining the spray irrigation system. Refinement of the spray irrigation system would be developed in consultation with DFO and MELP.

5.3.1.5 Water Use

The Pine River Plant obtains raw water for process operations from local groundwater wells. The proposed expansion would result in raw water requirements increasing by approximately 75%. This increased demand could result in potentially adverse effects on the local groundwater regime and on other water users.

Westcoast stated that plant water requirements would increase from 48 000 m³ per year to 84 000 m³ per year. The expanded plant design incorporates recycling and reuse of selected water streams to minimize plant water use. Therefore, the water requirement of the plant would increase to a lesser extent than the gas processing rate. Consultant studies indicate that the increased water demand would result in an increase in utilization of the capacity of the wells from 12 percent to 21 percent. Westcoast reported that there are no other water wells in the vicinity of the wells supplying the Pine River Plant and the nearest other wells are recharged from the Pine River.

5.3.1.6 Waste Management

Wastes generated at the plant could have potentially adverse environmental effects if they are not handled and disposed appropriately. Westcoast stated that its system-wide waste management program would be extended to include wastes generated at the expanded plant. Westcoast further stated that all wastes which cannot be recycled or reused on-site would be disposed in an approved manner.

5.3.1.7 Soils, Vegetation and Wildlife

Surface disturbance associated with the construction of the plant expansion and the sulphur pipeline could potentially have adverse effects on soils and vegetation. Westcoast indicated that no new clearing is required to accommodate the proposed plant expansion. The sulphur pipeline would follow, for the most part, the existing Grizzly sales line right-of-way in order to minimize disturbance to soils, vegetation and wildlife.

The sulphur pipeline would be an above-ground line which could pose a barrier to wildlife movement. Westcoast proposes to mitigate this concern by ensuring that the pipeline has sufficient clearance every 200 to 400 metres to permit the passage of wildlife. Westcoast stated that approximately 10 hectares of forest would be removed resulting in a loss of fur-bearer habitat. However, Westcoast submitted that the early seral stage of development is more productive for many plant browse species. This, combined with the benefits of additional edge habitat, would have a positive effect for many songbirds and mammal species.

5.3.1.8 Fisheries

Construction of the plant expansion and the sulphur pipeline could potentially have an adverse effect on local fisheries resources, primarily at Hasler Creek. Westcoast proposes to install temporary bridge structures during the winter to permit the transport of heavy equipment to the plant site. As well, Westcoast would install an above-ground crossing for the sulphur pipeline at Hasler Creek. Westcoast submitted that the installation of the temporary bridge structures and the sulphur pipeline crossing of Hasler Creek would not require any instream work. Westcoast further submitted that detailed crossing designs would be developed in consultation with and approved by DFO and MELP.

5.3.2 Pipeline Facilities

5.3.2.1 Geology and Soils

The proposed raw gas gathering pipelines would encounter a variety of surface materials including bedrock, colluvium, till, glaciofluvial deposits, glaciolacustrine deposits, and alluvial deposits. The terrain varies from flat river valley bottoms to steep mountain slopes. Westcoast acknowledged the potential for slope stability problems as well as surface erosion following surface disturbance resulting from construction. Westcoast submitted that these concerns could jeopardize long-term pipeline integrity, unless adequate protective measures are incorporated. Westcoast proposed the establishment of controls for surface, subsurface and ditchline water flows on slopes which pose stability problems. As well, revegetation of the disturbed lands would be employed as a final stabilizing measure.

5.3.2.2 Vegetation

Westcoast submitted that the clearing of the combined rights-of-way would effectively change approximately 115 hectares of forest and shrubland cover types to a persistent grass community. Approximately 6 000 m³ of merchantable coniferous timber would be salvaged by pre-logging the rights-of-way. Slash would be disposed by burning in a manner and at a time required by the B.C. Ministry of Forests.

Clearing activities could potentially affect rare species of plants known to occur in the project area. Westcoast has undertaken to conduct a rare plant survey along the pipeline routes prior to clearing operations. Westcoast submitted that routing modifications would be made in order to avoid sites identified as having high botanical significance. Westcoast also committed to determining the presence of localized ground lichen communities by conducting a field survey prior to construction and subsequently making routing modifications in order to avoid disturbance of these communities.

5.3.2.3 Wildlife

Construction of the pipeline facilities could potentially have an adverse effect on wildlife in the project area. Westcoast submitted that the potential effects include sensory disturbance and habitat alienation, blockage of seasonal or daily movements, habitat alteration and fragmentation, increased access (and associated hunting and poaching pressures), and direct project-related mortalities.

Westcoast submitted that because the pipeline construction is scheduled from June to September, the sensitive reproductive period of May to early June, and the late winter period of January to April for most wildlife species common to the area would largely be avoided by construction activities. The project area supports an above average bear population which could be adversely affected by construction activity. Westcoast submitted that grizzly bears are less tolerant of industrial activities than black bears and are, therefore, more likely to occupy the remote subalpine forests and alpine meadows. Consequently, grizzlies will most likely occur along the upland sections of the Grizzly Loop and Chamberlain Pipeline, as well as in the Barbour Creek headwaters near the Murray River Pipeline route. Black bears are more commonly found in the lowland area and more developed habitats adjacent to the Sukunka Loop and northern portions of the Murray River Pipeline. Westcoast stated that guidelines will be provided to workers on appropriate conduct for working in bear habitat. During the early stages of construction, nests containing unfledged raptors might be encountered. Westcoast stated that should an active nest be observed during surveying or clearing operations, activities would be suspended within 200 m of the nest until B.C. Fish and Wildlife personnel could be contacted for special instructions or approval to proceed.

Westcoast submitted that wildlife species that reside in the area would experience a brief period of sensory disturbance. However, Westcoast stated that the impacts from sensory disturbance are considered to be short-term, localized events of low to moderate magnitude.

Westcoast submitted that the proposed construction period would not coincide with major seasonal wildlife movements. Day-to-day forage movements may be obstructed, however, such movement blockages would only be short term. Westcoast proposed to mitigate this concern by ensuring there would be breaks in spoil piles, slash windrows, open ditches and strung pipe at approximately 500 m intervals. Westcoast submitted that, with the

implementation of such measures, pipeline-related obstructions would be short term, localized events of low magnitude.

Westcoast submitted that about 115 hectares of brush or forest would be cleared and that from a habitat perspective, such a limited clearing program would have negligible impacts on regional wildlife populations. In the medium to long term, the herbaceous and shrub communities which would develop along the rights-of-way through revegetation efforts and natural succession would enhance local habitat diversity.

Westcoast submitted that of the rights-of-way to be developed, the Grizzly Loop, the Sukunka Loop and the Chamberlain Pipeline would all parallel or closely follow existing pipeline right-of-ways and would not represent significant new access potential in the area. The Murray River Pipeline would either closely parallel or remain within several hundred metres of existing roads or seismic lines. Only the northern 4 kilometres would be in an area which is inaccessible to all-terrain vehicles. Westcoast stated that it would be prepared to implement access control measures should MELP express concerns over new access into this area.

Westcoast submitted that a small number of project-related road kills from vehicle-animal collisions during construction would likely occur. Establishment of an on-site camp would reduce travel loads on the roads which would minimize the road kill potential. Westcoast further submitted that these road kill wildlife deaths would represent long-term, sub-regional impacts of low magnitude.

Westcoast stated that firearms and recreational vehicles would be limited for workers on site in order to minimize the potential for opportunistic kills by pipeline personnel. Camp wastes would be managed by daily incineration or off-site trucking to avoid attracting nuisance animals, which could result in their destruction.

5.3.2.4 Fisheries

Westcoast submitted that a number of the streams required to be crossed by the proposed pipelines are fish-bearing. Information provided on fisheries is largely based on historic data and Westcoast stated that it plans to conduct an additional assessment of fisheries resources and aquatic habitats during the summer of 1993. Westcoast has undertaken to comply with all conditions contained in a letter from DFO dated 29 April 1993. These conditions include requirements for the preparation of a Stream Survey Report and Access Plan in consultation with and approved by DFO and MELP.

Views of Interested Parties

Mr. Jack Hannam, Director of Electoral Area 'E' of the Peace River Regional District, raised the concern in a written submission and at the hearing of the use of raw sour gas for fuel by producers. Mr. Hannam urged that a sweet gas line be run from the Pine River Plant back to the producers. Mr. Hannam also urged that Westcoast only be allowed to increase daily sulphur emissions at the plant by an additional 5 tonnes.

Mr. M.D. Sawyer, representing the RMEC, and on behalf of the Chetwynd Environmental Society, the Western Canada Wilderness Committee, the Speak Up for Wildlife Foundation and the Riel Institute, submitted through letters to the Board prior to the hearing and in argument to adjourn the hearing that the application was incomplete. RMEC stated that fisheries baseline work was not complete and has not been proposed to be complete until after the Board has rendered a decision on the application. RMEC argued that there is only limited reference to the scientific literature on grizzly bears, making it impossible to use the application as a means of determining the significance of any impact. RMEC submitted that "there are many other examples in the application where there are glaring deficiencies", and stated that in the absence of the completed information, it would "not have the opportunity to be heard on any environmental evidence that is subsequently filed to these hearings".

RMEC submitted that, with regard to the incomplete data, the Board cannot possibly comply with the direction provided in section 3 of the EARP Guidelines Order. Section 3 states that the decision-making authority (the Board) shall ensure that the environmental implications of all proposals are fully considered. RMEC also submitted that the Board has not established, in consultation with the FEARO, written procedures to be followed for making a determination under section 12 of the EARP Guidelines Order as required by section 16 of the EARP Guidelines Order.

Mr. Conrad, on behalf of the Riel Institute and Mr. R.E. Wolf, submitted that the Impact Statement was deficient in a number of relevant respects. Mr. Conrad also submitted that the project is being defined in an unduly narrow way. Mr. Conrad argued that the comprehensive and cumulative impacts associated with this particular project would also involve the drilling of an additional 500 gas wells in the area. He further argued that all of those impacts ought to be inspected and treated in any Impact Statement.

In a letter addressed to the Board and dated 29 April 1993, DFO submitted that a commitment document has been developed as a result of discussions amongst DFO, MELP and Westcoast which would ensure that impacts to fish and fish habitat would be insignificant or mitigable with known technology. DFO further submitted that it would not object to the proposed project provided the Board attaches to any approval the conditions set out in DFO's letter.

Views of the Board

The Board noted that Mr. Hannam urged that a sweet fuel gas line be run from the Westcoast Plant back to the producers in order to reduce regional sulphur emissions. The Board is of the view that this is a matter concerning the Province and the gas producers and is, therefore, not within the Board's jurisdiction. Mr. Hannam also urged that sulphur emissions from the proposed Pine River Plant Expansion be limited to an additional 5 tonnes per day for a total sulphur emission of 15 tonnes per day. The Board notes that the Province already regulates sulphur emissions at the existing plant, and that any increase in emissions would be subject to the Province's permitting process. Additionally, the Province has established draft sulphur recovery guidelines and Westcoast has indicated that the expanded plant would achieve a sulphur recovery rate which meets or exceeds the Province's draft sulphur recovery guidelines. The Board is of the view that the established regulatory requirements of the Province are acceptable and that it is unnecessary to impose additional sulphur emissions restrictions for the proposed plant expansion.

RMEC stated that the environmental information submitted by Westcoast was incomplete. RMEC made particular reference to baseline fisheries data as being deficient. With respect to the fisheries data, the Board notes that DFO has no objection to the project proceeding providing the Board includes in its approval, the condition specified in DFO's letter to the Board dated 29 April 1993. The Board is of the view that the commitments made by Westcoast related to fisheries studies and stream crossing design, along with the conditions referred to in DFO's letter, would ensure that the potential effects on fish and fish habitat would be insignificant or mitigable with known technology.

The Board notes RMEC's concerns related to the adequacy of wildlife studies and the potential for the project to have an adverse effect on species such as the grizzly bear. The Board also notes testimony provided by Mr. Eccles, Westcoast's wildlife consultant and Pipeline Facilities Panel member, which stated that half of the proposed pipeline facilities are to be looped and would therefore follow existing rights-of-way. The new pipelines have been routed to follow existing corridors and rights-of-way as much as possible. The Board is of the view that the proposed project affords only limited new access and that the timing for project construction is such that it avoids critical periods for wildlife including grizzly bears.

RMEC raised the matter of the responsibility of the Board, under section 3 of the EARP Guidelines Order, to ensure that the environmental implications of the proposed project are fully considered was raised by RMEC. The Board is of the view that through the Board's hearing process and the environmental screening under the EARP Guidelines Order, the environmental implications have been fully considered.

RMEC also raised the question of whether or not the Board has established procedures to be followed for making a determination under section 12 of the EARP Guidelines Order. As discussed in section 1.3, the Board has established appropriate procedures which are in place and are being followed by the Board in making determinations under section 12 of the EARP Guidelines Order.

Mr. Conrad submitted that the proposed project was too narrowly defined and that the Impact Statement should include all those impacts associated with an additional 500 wells which would be drilled in the area. The Board notes that well licensing is the responsibility of the Province. Through its referral process, the Province ensures that well licence applications are reviewed by appropriate provincial departments to determine potential impacts and establish appropriate conditions for approval of applications. The Board is of the view that regulation and, therefore, assessment of the impacts of those wells is the responsibility of the Province.

With respect to air quality, the Board notes the results and limitations of the SO₂ dispersion modelling described by Westcoast for predicting ambient concentrations of SO₂. The Board also notes that the Province, in its letter dated 4 May 1993, has recognized that the modelling-based assessment was conservative in protecting air quality. The Board is of the view that, while SO₂ emissions from the expanded plant are expected to rarely exceed the provincial and federal ambient objective, further work is required to verify this. The Board would therefore require that Westcoast comply with those requirements related to SO₂ emissions in the Province's letter. These include measures to refine the modelling, to assess current health of the most SO₂-sensitive vegetation, to establish a monitoring program to assess potential impacts to vegetation and the identification of mitigation measures that would be taken in the event significant effects are predicted. The Board would also require that in the event

significant effects are predicted, the proposed mitigation measures to be employed must render those effects insignificant. The Board would further require that Westcoast submit a report summarizing the results and recommendations flowing from those requirements one year after the expanded facility commences operation.

The Board notes that the Pine River Plant Expansion would result in an increase in emissions of greenhouse gases. Canada has committed to stabilize these emissions at 1990 levels by the year 2000. Westcoast has indicated that opportunities to offset an increase of these emissions within the context of Pine River Plant Expansion are limited. Westcoast has therefore undertaken to inventory all greenhouse gas emissions on a system-wide basis to identify opportunities to reduce these emissions. The Board would require Westcoast to submit the results of this study including specific management strategies and time frames for reducing these emissions.

With respect to sulphur management, the Board notes that Westcoast may find it necessary at some point in the future to store sulphur and that the most likely storage method will be by pouring-to-block. Should this eventuality occur, the Board would require that Westcoast comply with MELP's first three requirements related to sulphur block management as outlined in its letter dated 4 May 1993. In addition, Westcoast would be required to seek Board approval prior to pouring any new sulphur blocks.

With respect to water quality, and specifically the disposal of effluent by spray irrigation to the land, the Board notes that Westcoast does not propose an increase in the volume of effluent to be disposed. The Board also notes that the effects of past spray irrigation practices have been insignificant. Westcoast's proposed modification to the spray irrigation process would serve to enhance the process. However, the Board would require Westcoast to submit its proposed changes to the process for approval by the Board prior to their implementation.

With respect to fisheries and aquatic habitat, the Board notes that Westcoast has undertaken to comply with all conditions which are attached to DFO's letter dated 29 April 1993. These conditions include terms of reference for additional site-specific assessment work and specific mitigation measures to be followed during stream crossing construction. The Board would require Westcoast to comply with all these conditions. As well, the Board would require that the Stream Survey Report and Access Plan referenced in the letter be submitted to the Board for approval prior to construction.

With respect to vegetation, Westcoast has committed to conduct surveys for rare and endangered plants and for ground lichen communities. Westcoast indicated that pipeline routing would be adjusted to avoid disturbance to any rare and endangered plants and ground lichen communities. The Board would require Westcoast to submit the results of these surveys and identify routing changes for approval prior to construction.

With respect to wildlife, Westcoast has indicated that the majority of the rights-of-way required for the Grizzly pipeline system expansion will either follow or closely parallel existing rights-of-way, roads, and seismic lines. Only the upper four kilometres of the proposed Murray River pipeline would afford new access. While the proposed Grizzly pipeline expansion system results in only limited new access, the Board is of the view that any measures that could be taken to minimize utilization of that new access would be beneficial in protecting wildlife and wildlife habitat. Therefore, the Board would require that Westcoast

submit an access plan for approval prior to construction, which includes specific measures for controlling utilization of new access.

The Board is satisfied with the environmental information provided by Westcoast with regard to the potential adverse effects which may result from the construction and operation of the proposed facilities and is satisfied with Westcoast's proposed monitoring and mitigation measures. In addition to implementing its own proposed environmental protection measures, Westcoast would be required by the Board to meet the Board's associated requirements and also those agreed with all other regulatory agencies. The Board is of the view that if all those conditions are met, the potentially adverse environmental effects of the Pine River Plant and Grizzly Pipeline System Expansion Project, including the social effects directly related to those environmental effects, would be insignificant or mitigable with known technology.

The Board would require, as conditions of approval, that Westcoast comply with all undertakings and commitments made in its application, in its response to information requests, and during the hearing.

5.4 Socio-economic Matters

5.4.1 Local Hiring

Westcoast has estimated on the basis of past experience that the Pine River Plant expansion and related pipeline projects would result in 1,620,000 person hours of work, with an estimated 600,000 person hours accruing to Peace River District residents. Thus some 37% of the workforce would be drawn from the local labour market. Westcoast noted that for large projects of this nature, the local supply of qualified labour often falls short of the demand due to the highly technical nature of much of the work. The shortfall is filled by recruiting specialized labour on a national basis.

Westcoast believes that its estimated 37% local and regional employment target is reasonable given the nature of the project and is attainable for several reasons. Firstly, its contractors are instructed to use reasonable efforts to hire within the locality of a project. Secondly, cost considerations in terms of reduced travel and living expenses provide an incentive for contractors to hire locally. Thirdly, Westcoast believes that its approach of breaking down the overall project into smaller segments encourages the use of local contractors and hence local labour. Lastly, Westcoast is committed to closely monitoring its contractors' local hiring performance and taking remedial action when required.

Westcoast also stated that while local hiring preference is its policy, the final decision on hiring must rest with the contractors in accordance with established standards and requirements. Westcoast submitted that contractors have the responsibility of ensuring a skilled labour force to effectively carry out assigned tasks. Accordingly, Westcoast avoids intervening in a contractor's day-to-day hiring decisions.

Westcoast is engaged in an affirmative action process to employ local natives and to contract with native companies. Westcoast stated that agreement has been reached with local native leaders on employment and procurement measures related to the project. The outcome will be subject to monitoring and reporting.

Spokespersons representing local and B.C. trade unions¹ expressed concerns that Westcoast's contracting approach and its contractors' hiring practices could result in restricted opportunities for their members. In their view, fewer opportunities for their members would mean an inadequate and unacceptable level of local hires. They expressed the belief that there are sufficient qualified tradespersons in B.C. to fill far more jobs than had been filled on past Westcoast projects. As well, a statement delivered by Mr. J. Hannam of the Peace River Regional District, Electoral Area 'E' voiced the opinion that an out of area contractor, whether union or non-union, should not bring most of its workforce from outside the region.

Westcoast was, therefore, asked to urge its contractors to hire qualified local workers wherever possible.

Views of the Board

The Board accepts Westcoast's position that local hiring is a priority, but within the constraint of ensuring a qualified workforce and a cost-effective project. The Board notes that all parties appear to hold this view in common. The Board believes that Westcoast's stated measures to promote local hiring for this project are sound. However, Westcoast's 37% local hire estimate is based on 1991 labour market conditions, which may no longer be applicable. The Board encourages Westcoast to base its local hiring estimate on local and/or regional labour market supply information which is current at the time that workers are hired. In addition, the production of a regular local hiring status report with commentary on the prevailing regional labour market, would help to reduce uncertainty as to the degree to which contractors adhere to Westcoast's local hiring policy and as to the success of Westcoast's policy initiatives. The Board would require Westcoast to monitor local hiring performance in light of current local and/or regional labour market conditions, and to provide the Board with bimonthly statistical and analytic reports on anticipated and actual local hiring performance.

5.4.2 Contracting Methods

Westcoast has chosen to use a project management approach, in which Westcoast exercises the overall project management function itself rather than to employ a single general contractor. In this case, the project management approach involves breaking the project down into smaller components (for example, civil and foundation, mechanical and structural, and electrical subcontract packages). Tenders for each subcontract are addressed to some six to eight qualified union and open shop contractors. Westcoast maintains that its proposed approach is the norm for large industrial projects in Western Canada and would result in a reduced overall project cost, lower contractor risks and maximized local involvement. Westcoast also believes that a general contractor approach is impractical given the short lead time available for this

¹

Mr. B. Rogers represented the British Columbia Provincial Council of Carpenters.

Mr. R. Loro represented the Peace River District Labour Council.

Mr. R. Dickson represented the International Association of Bridge, Structural and Ornamental Ironworkers, Local 97, the International Brotherhood of Electrical Workers, Local 213, the International Union of Bricklayers and Allied Crafts, Local 1, the Operative Plasterers and Cement Masons' International Association of the United States and Canada, Locals 779 and 919, the Sheet Metal Workers International Association, Local 280, and the United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry of the United States and Canada, Local 170.

project. It estimates that the general contractor approach could add a year or more to the project starting date.

Spokespersons for B.C. trade unions expressed concerns with Westcoast's contract approach. In general they favour a lump sum, open tender, general contractor approach. In their view, the general contractor approach is more conducive to the proper working of the market place and for ensuring the lowest total project cost. They also feel that the project management approach, which involves subcontracting, imposes an undue emphasis on the lowest labour cost. As labour costs comprise a major component of the project cost, this emphasis disadvantages unionized contractors, who generally have higher labour costs. Moreover, in these parties' views, Westcoast's approach would contribute to lower wages and, therefore, lower overall benefits.

Views of the Board

The Board has reviewed the two contracting approaches. The Board believes that Westcoast should bear the responsibility of selecting the form of contracting which it considers to be the most cost and time effective for a given project. The Board notes also that the gas producers and shippers who will pay the tolls based on project costs have supported Westcoast's application and have not questioned Westcoast's contract approach. On the basis of the evidence presented, the Board believes that Westcoast's approach is appropriate.

5.4.3 Labour Standards

Westcoast maintains that the project workforce will be qualified to meet required specifications and workmanship levels, and to perform its tasks safely. The Company maintains that there have been no problems in this regard on its recent projects. Westcoast also maintains that the project workers receive reasonable wages because most employees are covered under union contracts, and reasonable wages are required to attract qualified tradespersons. Westcoast stated that it was supportive of unions, and that unionized contractors perform the majority of work on its projects. The Company stated that it was unaware of discriminatory hiring practices by contractors on the basis of craft union membership.

Spokespersons for the represented unions expressed their concerns regarding fair wages, skill levels and discriminatory hiring practices by contractors. The fair wage concern arose from a perception that reimbursable contracts, which Westcoast proposes to use, would inevitably depress wages; the rationale being that bidders, in order to reduce costs, will usually decrease the wage component in their proposals. Given that wages are the largest component of reimbursable contracts, bidders will focus on this component to ensure that their total bid is minimized. Accordingly, the union representatives argue that this approach would bias the process against unionized contractors who employ higher wage crafts union members. These spokespersons suggested that Westcoast should adhere to the British Columbia Fair Wages Policy, which would shift the bidders' focus to factors other than wages.

Concern was also expressed as to whether a non-craft union labour force would have the necessary skills to perform the work safely and efficiently, in accordance with established standards and requirements.

Finally, labour spokespersons alleged that on past Westcoast projects, their members have been subjected to discriminatory hiring practices. They cited instances where applicants applying through Canada Employment Centres were required to complete contractor supplied employment applications that asked whether the applicant was a member of a trade union and if so which trade union. The spokespersons submitted that this practice clearly raises the suspicion that the intent of this particular application process is to identify their members. One spokesperson submitted that this kind of hiring practice could be viewed as *prima facie* evidence of discrimination between union membership and non-union membership.

Views of the Board

The Board believes that wage determination is the responsibility of the bidders, most of whom are unionized contractors operating in accordance with collective agreements. In such cases, market forces should determine acceptable wage rates. The Board is not in a position to comment on the extension of the application of the British Columbia Fair Wages Policy to the private sector. It understands that fair wages policies normally are restricted to publicly funded projects.

The Board notes Westcoast's undertaking whereby it agreed that where discriminatory hiring practices are alleged against a contractor, Westcoast would permit the union in question to present its evidence regarding the alleged discrimination, and Westcoast would investigate any such incidents and take appropriate action to prevent and/or resolve abuses. The Board also notes that recourse to the British Columbia Labour Relations Board is available in the event of discriminatory hiring practices. The Board finds that these avenues for recourse are satisfactory.

With respect to other labour standards issues, such as skill levels and workplace safety, the Board has an interest in seeing that standards and requirements are met. The Board has noted that no evidence has been submitted which would suggest that acceptable standards will not be met on the proposed project. Nonetheless, the Board would encourage Westcoast to work closely with its contractors to ensure all appropriate standards and objectives are being met.

5.4.4 Local Impact Analysis

Westcoast stated that the matters covered in its local impact analysis, and the degree of the investigations, were influenced by the views of Chetwynd and Peace River District representatives. Thus Westcoast's analysis of local impacts concentrated on potential local costs of the project such as public service, infrastructure and accommodation effects that could impose an undue burden and consequently cause a hardship to the affected community or region. The associated benefits analysis focused mainly on the likely dollar injections into the communities as a result of expenditures flowing from wages, taxes and procurement of material and services. This analysis was based on extrapolating from past experience relating to other projects.

Mr. R. Dickson, representing six B.C. craft unions, stated that Westcoast's economic benefits analysis lacked sufficient detail, specifically with respect to employment multipliers and extra-provincial expenditures and hiring. Mr. Dickson expressed the belief that Westcoast should be required to provide a far more extensive cost-benefit analysis for major projects, and suggested that the Board develop detailed guidelines regarding the content of such analyses.

Views of the Board

In 1979, the Board issued guidelines for socio-economic information to be filed as part of an application. These guidelines outline the subject areas for which information may be required. The intent is to focus on critical issues. In its initial review an applicant must, therefore, decide upon those subjects which need to be addressed and the degree of detail corresponding with the nature and magnitude of the anticipated socio-economic impact of the proposed project, including possible cumulative impacts and public concerns. The Board ultimately has the authority to decide whether a given socio-economic impact assessment is adequate. The Board is of the opinion that, in this particular case, the socio-economic analysis of potential local impacts is sufficiently detailed.

5.4.5 Heritage Resources

Westcoast provided the Archaeological Overview Report with its application for the pipeline project area. The report indicated that archaeological and heritage information for the area was limited. Westcoast has made a commitment to undertake archaeological and historical assessments by qualified archaeologists of the proposed pipeline projects prior to construction. Westcoast is also committed to reporting to the British Columbia Heritage Conservation Branch any artifacts or potential sites discovered during construction.

Views of the Board

The Board accepts Westcoast's undertakings to carry out archaeological and historical assessments for each of the proposed pipeline projects and to report all discoveries at the construction stage to the Province. The Board would require that Westcoast file for Board approval an assessment prior to the commencement of construction of each of the proposed pipelines.

Financial Matters

6.1 Financing

Westcoast estimated the total capital cost, including direct cost, overhead, contingency, and AFUDC, of the Pine River Gas Processing Plant expansion (about \$232 million) and the Grizzly Pipeline System expansion (some \$68 million) to be approximately \$300 million. Westcoast envisaged an in-service date of 1 November 1993 for the Chamberlain pipeline and 1 November 1994 for the balance of the expansion facilities (both plant and pipeline). The Company estimated its total 1993 cash requirements for capital expenditures, including facilities reflected in the Board's RH-3-92 decision¹ (\$142 million), and 1993 Section 58 applications, Amendments 1 through 7 (\$34 million) to be \$176 million.

Westcoast stated that the applied-for facilities would be financed from internally generated funds and short-term credit facilities. Permanent financing would be provided by the issuance of long term debt and equity consistent with Westcoast's approved debt equity ratio. Long term debt financing would likely be completed through the issuance of additional series of debentures, the timing and size of which had not been determined but would depend on the financial market conditions and the Company's cumulative cash requirements.

Views of the Board

The Board is of the view that Westcoast has the ability to finance the applied-for facilities.

6.2 Raw Gas Transmission Demand Toll Surcharge

Westcoast indicated that expansion shippers who executed firm service contracts for treatment service also agreed to contract for Contract Demand Raw Gas Transmission Service through the Grizzly Raw Gas Transmission System; however, the expiry dates for such contracts were not yet available. Therefore, Westcoast was unable to specify whether a demand toll surcharge would apply to any particular contract. Westcoast explained that pursuant to its Raw Gas Transmission Expansion Policy approved by the Board, a toll surcharge is determined by comparing revenues and costs over the lesser of the contract term or the reserve life. In contracts where the reserve life was not a limiting factor, the term of the contract would be set such that a surcharge would not be required. Westcoast stated that calculations in this respect were being finalized as a result of updated supply information provided by the shippers and that the results of this analysis would be provided to the Board. In response to an undertaking given during the hearing, Westcoast provided, as an example, calculations to demonstrate that for the 323.9 mm (12.75 inch) diameter Chamberlain Pipeline, no toll surcharge would be required for a contract term of five years.

¹ Board Reasons for Decision dated March 1993 on an application by Westcoast dated 31 July 1992, as amended, for new tolls effective 1 January 1993 (Hearing Order RH-3-92).

Views of the Board

The Board will determine whether a raw gas transmission demand toll surcharge is required once Westcoast advises of the contract expiry dates and, if necessary, will issue a toll order pursuant to Part IV of the Act.

6.3 Estimated Toll Impact

Westcoast provided proforma calculations showing the impact on its cost of service and demand tolls in Zone 1 (Raw Gas Transmission Pipeline Facilities) and Zone 2 (Gas Processing Facilities) of the cost of construction and operation of the proposed plant and pipeline expansion on a rolled-in basis for a forecast period of 10 years (1994-1004) under two scenarios: with and without drawdown of deferred income taxes. A drawdown of accumulated deferred income taxes and amortization to cost of service in the amount required to reduce utility taxable income to zero in 1992 and subsequent years was approved by the Board in its RH-1-92 Reasons for Decision¹.

The results of the analysis reflecting drawdown of deferred income taxes illustrate that over the period 1994 to 2004, Zone 1 tolls would on average be approximately nine percent lower than they would be without the proposed expansion. The Zone 2 tolls, on the other hand, would be higher over that same period by an average of approximately one percent.

None of the interested parties expressed concern with Westcoast's analysis of the estimated toll impact.

Views of the Board

The Board finds Westcoast's calculations regarding toll impact to be reasonable.

¹ Board Reasons for Decision dated August 1992 on an application by Westcoast dated 12 December 1991 for new tolls effective 1 January 1992 (Hearing Order RH-1-92).

Economic Feasibility

The Board determined the economic feasibility of the proposed expansion by examining the likelihood that the facilities would be used at a reasonable level over their economic life and that the associated demand charges would be paid. In arriving at its conclusion, the Board had primary regard for the long term availability of gas supply in the Pine River supply area, the long term market outlook for gas in the markets served by Westcoast, the contractual commitments of shippers to utilize the additional capacity, and the potential impact on tolls of the applied-for facilities.

Westcoast's supply and deliverability forecasts discussed in Chapter 2 of these Reasons show that an excess of supply over processing capacity exists in the Pine River supply area. This excess supply points to the need for additional capacity at the Pine River Plant and additional raw gas gathering facilities upstream of the plant.

Westcoast submitted that a positive long term outlook for gas demand exists in the markets served by its system. Total annual deliveries are forecast to increase from $14\ 702\ 10^6\text{m}^3$ (519 Bcf) to $19\ 122\ 10^6\text{m}^3$ (675 Bcf) between 1993 and 2002. This evidence demonstrated that the applied-for facilities will be required over the long term to serve growing gas demand in Westcoast's market areas.

Westcoast has filed the executed ten-year firm service agreements for the additional capacity on the raw gas transmission service behind the Pine River Plant and for processing service at the plant itself. In addition, the Pine River Plant expansion shippers have agreed to extend a portion of their existing treatment service agreements from one year to five years. These contract extensions lessen the risks associated with having a high level of short term renewable service contracts. The existence of long-term contracts underpinning the expansion facilities and the voluntary contract extensions demonstrate the need for the facilities.

An analysis of the toll impacts of the proposed facilities was conducted by Westcoast. The result of this analysis show that over the 1994 to 2004 period, Zone 1 tolls would, on average, be nine percent lower than they would be without the expansion. Zone 2 tolls, on the other hand, would be on average one percent higher. These changes in tolls are not likely to affect the renewal of contracts for gathering and processing services.

Views of the Board

The Board is satisfied that the evidence demonstrates that the proposed expansion is economically feasible given that there is a strong likelihood that the facilities would be used at a reasonable level over their economic life and that the associated demand charges would be paid.

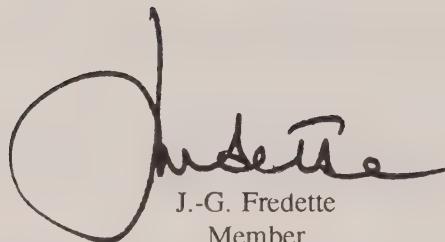
The Board is of the view that the ten-year service contracts underpinning the applied-for facilities and the voluntary extension of existing service contracts taken together with the evidence on the adequacy of gas reserves and productive capacity and the existence of viable long-term markets for the gas, demonstrate that this project is economically feasible.

Disposition

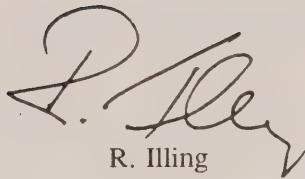
On the basis of all the foregoing, the Board finds that the applied-for Pine River Gas Plant and Grizzly Pipeline System Expansion is in the public interest. Accordingly, the Board has issued, pursuant to section 58 of the Act, Order XG-W5-28-93 (Appendix II) exempting Westcoast from the provisions of sections 30, 31 and 47 of the Act in respect of the expansion facilities.



R.B. Horner, Q.C.
Presiding Member



J.-G. Fredette
Member



R. Illing
Member

Calgary, Alberta
June 1993

List of Issues

1. The need for an expansion of the Pine River Gas Plant and Grizzly Pipeline System in the near term, and the appropriate sizing and timing of any such expansion.
2. The likelihood of the proposed expansion facilities being used at a reasonable level over their economic life and the likelihood of the associated demand charges being paid.
3. The adequacy of the upstream gas supply to support the proposed expansion.
4. The adequacy of downstream facilities to accommodate the additional gas throughput that would result from the expansion.
5. The reasonableness of Westcoast's macro and project-specific domestic and export demand forecasts for natural gas.
6. The potential environmental effects and the directly related socio-economic effects of the proposed facilities during and after construction.
7. The safety of the design of the proposed sour gas gathering facilities (i.e. Grizzly Pipeline System expansion) and the proposed Pine River Gas Plant expansion.
8. The reasonableness of the associated cost estimates having regard to the degree of accuracy of the cost estimates at this stage of the project and the expected level of construction activity in the pipeline sector in North America in 1993/94.
9. The appropriateness of the routing for the proposed pipeline facilities.
10. The completeness and effectiveness of Westcoast's early public notification process.
11. The appropriate terms and conditions to be included in any certificate or order which may be issued.

Order XG-W5-28-93

IN THE MATTER OF the *National Energy Board Act* ("the Act") and the regulations made thereunder; and

IN THE MATTER OF an application, pursuant to section 58 of the Act, by Westcoast Energy Inc. ("Westcoast"); filed with the Board under File 3400-W005-67.

B E F O R E the Board on 10 June 1993.

WHEREAS the Board received an application from Westcoast dated 19 January 1993 for an order pursuant to section 58 of the Act granting exemption from the provisions of sections 30, 31, and 47 of the Act in respect of a proposed expansion of its Pine River Gas Plant and Grizzly Pipeline System;

AND WHEREAS Westcoast filed with the Board, under covering letter dated 26 February 1993, a series of amendments to the application;

AND WHEREAS the Board issued Hearing Order GH-1-93 dated 10 March 1993 setting the application down for public hearing;

AND WHEREAS Westcoast filed further amendments to the application by correspondence dated 3 and 5 May 1993;

AND WHEREAS, pursuant to Hearing Order GH-1-93, the Board conducted a public hearing in Fort St. John, British Columbia on 5 and 6 May 1993 to consider the application;

AND WHEREAS pursuant to the *Environmental Assessment and Review Process Guidelines Order* ("the EARP Guidelines Order"), the Board has performed an environmental screening and has considered the information submitted by Westcoast and evidence adduced at the hearing;

AND WHEREAS the Board has determined, pursuant to paragraph 12(c) of the EARP Guidelines Order, that the potentially adverse environmental effects, including the social effects directly related to those environmental effects, which may be caused by the proposed expansion facilities are insignificant or mitigable with known technology and public concern about the proposal does not warrant referral for a panel review;

AND WHEREAS the Board has examined the application and considers it to be in the public interest to grant the relief requested therein;

IT IS ORDERED THAT the proposed Pine River Gas Plant and Grizzly Pipeline System expansion facilities, as more particularly described in Schedule A to this Order, are exempt from the provisions of sections 30, 31, and 47 of the Act, upon the following conditions:

General

1.
 - (a) Westcoast shall cause the additional facilities to be designed, manufactured, located, constructed and installed in accordance with those specifications, drawings, and other information or data set forth in its application, or as otherwise adduced in evidence before the Board, except as varied in accordance with paragraph 1(b) hereof.
 - (b) Westcoast shall cause no variation to be made to the specifications, drawings or other information or data referred to in paragraph 1(a) without the prior approval of the Board.
2. Unless the Board otherwise directs, Westcoast shall implement or cause to be implemented all the policies, practices, recommendations, procedures and undertakings for the protection of the environment included in or referred to in its application, its responses to the Board's Information Requests and the relevant sections of its Environmental Protection Manual Pipeline Construction, September 1992, or as otherwise adduced from the evidence before the Board in the GH-1-93 proceedings, including those conditions agreed to between Westcoast and the Department of Fisheries and Oceans and described in the letter and attachment dated 29 April 1993 and filed with the Board.
3. Unless the Board otherwise directs prior to 31 December 1994, this Order shall expire on 31 December 1994 unless the construction and installation with respect to the applied-for facilities has commenced by that date.

Prior to Commencement of Construction

4. Westcoast shall, prior to the commencement of construction, file with the Board copies of any provincial permits or authorizations which contain environmental conditions for the applied-for facilities as well as maintain an information file(s) in the construction office(s) which would include any changes made in the field, or permits obtained following the commencement of construction.
5. Westcoast shall, at least 15 days prior to the commencement of construction of each of the proposed pipelines and plant expansion facility, file with the Board an update of its Environmental Issues List, as it pertains to that pipeline or facility prepared in accordance with paragraph 28(1)(a) of the Board's *Onshore Pipeline Regulations*. If additional issues arise during construction, Westcoast shall file an updated Environmental Issues List in accordance with subsection 28(2) of the Board's *Onshore Pipeline Regulations*.
6. Westcoast shall, at least 15 days prior to the commencement of construction of the applied-for facilities, file with the Board a detailed construction schedule or schedules identifying the major construction activities.
7. Westcoast shall not commence construction of each of the pipelines until the following items have been filed with and approved by the Board in respect of each of those pipelines:

- (i) the results of the rare and endangered plant and lichen surveys referred to in the application and in the GH-1-93 proceeding, including any corresponding avoidance or mitigative measures;
- (ii) the results of the fisheries resources and aquatic habitat assessment referred to in the application and in the GH-1-93 proceeding, including the Stream Survey Report and Access Plan and any corresponding avoidance or mitigative measures;
- (iii) the results of the heritage resources surveys required by the Archaeology Branch of the Province of British Columbia, including any corresponding avoidance or mitigative measures; and
- (iv) a plan for controlling the utilization of new access.

8. Westcoast shall, prior to the commencement of construction of each of the proposed pipeline sections, file with the Board evidence that all land rights have been obtained for that proposed pipeline section.

9. Westcoast shall not commence construction of the proposed liquid sulphur pipeline leading from the Pine River Plant to the Petrosul sulphur pelletizing plant until the associated material specifications and welding procedures have been filed with and approved by the Board.

During Construction

10. Westcoast shall, during construction, file updated construction schedules, if any significant change to the schedules provided pursuant to condition 6 occur.

11. During construction, Westcoast shall file with the Board as well as any interested party who so requests in writing, in a format to be determined in consultation with Board staff, bimonthly construction progress and cost reports providing the completion percentage of each construction activity, a breakdown of costs incurred during the preceding two months, and an update of projected costs to complete the project including an explanation of any significant variances.

12. During construction, Westcoast shall monitor local hiring performance in light of current local and/or regional labour market conditions, and file with the Board bimonthly statistical and analytical reports on anticipated and actual local hiring performance.

Prior to Commencement of Operation

13. Westcoast shall, prior to the commencement of operation, file with the Board copies of any provincial permits or authorizations that have to be obtained prior to the commencement of operation of the expansion facilities.

14. Westcoast shall not commence operation of the proposed liquid sulphur pipeline until the associated documented operating and maintenance procedures (including the emergency procedures) have been filed with and approved by the Board.

15. Westcoast shall not commence operation of the expanded plant facilities until its proposed plans for modification of the effluent spray irrigation system have been filed with and approved by the Board.
16. Westcoast shall not commence operation of the expanded plant facilities until the revised Pine River Gas Plant Emergency Response Plan reflecting the addition of the proposed facilities.

Post-Construction

17. Westcoast shall file with the Board post-construction environmental reports in accordance with section 58 of the Board's *Onshore Pipeline Regulations*.
18. In the event that during the operation of the facilities Westcoast finds it necessary to pour liquid sulphur to block, Board approval of those plans prior to such action will be required.
19. Further to the commitments and undertakings made during the GH-1-93 proceedings, Westcoast shall file with the Board an assessment of all studies and monitoring related to air emissions following the start-up of the plant expansion and, for Board approval, any proposed mitigative measures.

Schedule A

**Westcoast Energy Inc.
Pine River Gas Plant and Grizzly Pipeline System Expansion**

Description and Estimated Cost of Applied-For Facilities

	<u>Cost Estimate</u> (\$000)
Pine River Gas Plant Expansion	231,542

The plant expansion involves the addition of facilities required to increase raw gas processing capacity from 7.37 $10^6 \text{m}^3/\text{d}$ (260 MMcf/d) to 15.9 $10^6 \text{m}^3/\text{d}$ (560 MMcf/d) and sulphur recovery capacity from 1097 to 2000 tonnes per day at an efficiency of 99 percent. The expansion facilities include:

(1) *Inlet Separation*

One new inlet separator.

(2) *Gas Sweetening*

One complete amine sweetening train.

(3) *Dehydration*

A new tri-ethylene glycol dehydration unit for controlling the water content of the sweetened gas.

(4) *Sulphur Recovery*

A complete MCRC train consisting of a reaction furnace, heat recovery boiler, four converters, reheat and sulphur condenser heat exchangers, two air blowers, sulphur rundown pits, storage tanks, instrumentation, and controls. Also included is a sulphur de-gassing system for reducing the residual H₂S level in the liquid sulphur product.

(5) *Waste Disposal*

Proposed facilities include a new incinerator and stack for the new MCRC unit.

(6) *Liquid Sulphur Pipeline*

An above-ground pipeline, 168.3 mm (6.63 inches) in diameter and 5.5 km (3.4 miles) in length, to carry liquid sulphur from the sulphur recovery plant to the sulphur pelletizing plant near Hasler Flats.

(7) *Utility and Auxiliary Facilities*

Major facility additions consisting of two engine driven generator units, a power boiler, heating medium heaters, tanks, and pumps. The control system, control room, shop, warehouse, and office facilities are also to be expanded.

(8) *Modifications to the Existing Plant*

Various modifications to maximize utilization of the existing plant facilities.

Grizzly Pipeline System Expansion

68,350

(1) *Chamberlain Pipeline*

5,678

A 323.9 mm (12.75 inch) diameter pipeline approximately 8.9 km (5.5 miles) in length connecting the Chamberlain field to the South Sukunka pipeline.

(2) *Murray River Pipeline*

16,106

A 323.9 mm (12.75 inch) diameter pipeline approximately 24.0 km (14.9 miles) in length connecting the Murray River field to the existing raw gas transmission system.

(3) *Sukunka Loop Pipeline*

17,894

A 610 mm (24 inch) diameter pipeline loop approximately 15.2 km (9.4 miles) in length providing additional pipeline capacity to the Sukunka and South Sukunka areas.

(4) *Grizzly Loop Pipeline*

28,672

A 610 mm (24 inch) pipeline loop approximately 26.6 km (16.5 miles) in length providing additional capacity to the Pine River Plant.

Estimated Total Cost

299,892

